Office of Technology Assessment

Congressional Board of the 99th Congress

TED STEVENS, *Alaska, Chairman*

MORRIS K. UDALL, *Arizona, Vice Chairman*

Senate

ORRIN G. HATCH
Utah

CHARLES McC. MATHIAS, JR.
Maryland

EDWARD M. KENNEDY
Massachusetts

ERNEST F. HOLLINGS
South Carolina

CLAIBORNE PELL
Rhode Island

House

GEORGE E. BROWN, JR.
California

JOHN D. DINGELL
Michigan

CLARENCE E. MILLER
Ohio

COOPER EVANS
Iowa

DON SUNDQUIST
Tennessee

JOHN H. GIBBONS
(Nonvoting)

Advisory Council

WILLIAM J. PERRY, *Chairman*
H&Q Technology Partners

DAVID S. POTTER, *Vice Chairman*
General Motors Corp. (Ret.)

EARL BEISTLINE
Consultant

CHARLES A. BOWSHER
General Accounting Office

CLAIRE T. DEDRICK
California Land Commission

S. DAVID FREEMAN
Lower Colorado River Authority

MICHEL T. HALBOUTY
Michel T. Halbouty Energy Co.

CARL N. HODGES
University of Arizona

RACHEL McCULLOCH
University of Wisconsin

CHASE N. PETERSON
University of Utah

JOSEPH E. ROSS
Congressional Research Service

LEWIS THOMAS
Memorial Sloan-Kettering
Cancer Center

Director

JOHN H. GIBBONS

The views in this OTA Case Study do not necessarily reflect the views of the Technology Assessment Board or of its individual members.

HEALTH TECHNOLOGY CASE STUDY 37

Nurse Practitioners, Physician Assistants, and Certified Nurse-Midwives: A Policy Analysis

DECEMBER 1986

CONGRESS OF THE UNITED STATES
Office of Technology Assessment
Washington, D.C. 20510

J952-103

Recommended Citation:

U.S. Congress, Office of Technology Assessment, *Nurse Practitioners, Physician Assistants, and Certified Nurse-Midwives: A Policy Analysis* (Health Technology Case Study 37), OTA-HCS-37 (Washington, DC: U.S. Government Printing Office, December 1986).

Library of Congress Catalog Card Number 85-600596

For sale by the Superintendent of Documents
U.S. Government Printing Office, Washington, DC 20402

Preface

Nurse Practitioners, Physician Assistants, and Certified Nurse-Midwives: A Policy Analysis is Case Study 37 in OTA's Health Technology Case Study Series. This case study has been prepared in response to a request by the Senate Committee on Appropriations.

OTA case studies are designed to fulfill two functions. The primary purpose is to provide OTA with specific information that can be used in forming general conclusions regarding broader policy issues. The first 19 cases in the Health Technology Case Study Series, for example, were conducted in conjunction with OTA's overall project on *The Implications of Cost-Effectiveness Analysis of Medical Technology*. By examining the 19 cases as a group and looking for common problems or strengths in the techniques of cost-effectiveness or cost-benefit analysis, OTA was able to better analyze the potential contribution that those techniques might make to the management of medical technology and health care costs and quality.

The second function of the case studies is to provide useful information on the specific technologies covered. The design and the funding levels of most of the case studies are such that they should be read primarily in the context of the associated overall OTA projects. Nevertheless, in many instances, the case studies do represent extensive reviews of the literature on the efficacy, safety, and costs of the specific technologies and as such can stand on their own as a useful contribution to the field.

Case studies are prepared in some instances because they have been specifically requested by congressional committees and in others because they have been selected through an extensive review process involving OTA staff and consultations with the congressional staffs, advisory panel to the associated overall project, the Health Program Advisory Committee, and other experts in various fields. Selection criteria were developed to ensure that case studies provide the following:

- examples of types of technologies by function (preventive, diagnostic, therapeutic, and rehabilitative);
- examples of types of technologies by physical nature (drugs, devices, and procedures);
- examples of technologies in different stages of development and diffusion (new, emerging, and established);
- examples from different areas of medicine (e.g., general medical practice, pediatrics, radiology, and surgery);
- examples addressing medical problems that are important because of their high frequency or significant impacts (e.g., cost);
- examples of technologies with associated high costs either because of high volume (for low-cost technologies) or high individual costs;
- examples that could provide information material relating to the broader policy and methodological issues being examined in the particular overall project; and
- examples with sufficient scientific literature.

Case studies are either prepared by OTA staff, commissioned by OTA and performed under contract by experts (generally in academia), or written by OTA staff on the basis of contractors' papers.

OTA subjects each case study to an extensive review process. Initial drafts of cases are reviewed by OTA staff and by members of the advisory panel to the associated project. For commissioned cases, comments are provided to authors, along with OTA's suggestions for revisions. Subsequent drafts are sent by OTA to numerous experts for review and comment. Each case is seen by at least 30 reviewers, and sometimes by 80 or more outside reviewers. These individuals may be from relevant Government agencies, professional societies, consumer and public interest groups, medical practice, and academic medicine. Academicians such as economists, sociologists, decision analysts, biologists, and so forth, as appropriate, also review the cases.

Although cases are not statements of official OTA position, the review process is designed to satisfy OTA's concern with each case study's scientific quality and objectivity. During the various stages of the review and revision process, therefore, OTA encourages, and to the extent possible requires, authors to present balanced information and recognize divergent points of view.

Health Technology Case Study Series[a]

Case Study Series No.	Case study title; author(s); OTA publication number[b]
1	Formal Analysis, Policy Formulation, and End-Stage Renal Disease: Richard A. Rettig (OTA-BP-H-9(1))[c]
2	The Feasibility of Economic Evaluation of Diagnostic Procedures: The Case of CT Scanning: Judith L. Wagner (OTA-BP-H-9(2))
3	Screening for Colon Cancer: A Technology Assessment: David M. Eddy (OTA-BP-H-9(3))
4	Cost Effectiveness of Automated Multichannel Chemistry Analyzers: Milton C. Weinstein and Laurie A. Pearlman (OTA-BP-H-9(4))
5	Periodontal Disease: Assessing the Effectiveness and Costs of the Keyes Technique: Richard M. Scheffler and Sheldon Rovin (OTA-BP-H-9(5))
6	The Cost Effectiveness of Bone Marrow Transplant Therapy and Its Policy Implications: Stuart O. Schweitzer and C. C. Scalzi (OTA-BP-H-9(6))
7	Allocating Costs and Benefits in Disease Prevention Programs: An Application to Cervical Cancer Screening: Bryan R. Luce (Office of Technology Assessment) (OTA-BP-H-9(7))
8	The Cost Effectiveness of Upper Gastrointestinal Endoscopy: Jonathan A. Showstack and Steven A. Schroeder (OTA-BP-H-9(8))
9	The Artificial Heart: Cost, Risks, and Benefits: Deborah P. Lubeck and John P. Bunker (OTA-BP-H-9(9))
10	The Costs and Effectiveness of Neonatal Intensive Care: Peter Budetti, Peggy McManus, Nancy Barrand, and Lu Ann Heinen (OTA-BP-H-9(10))
11	Benefit and Cost Analysis of Medical Interventions: The Case of Cimetidine and Peptic Ulcer Disease: Harvey V. Fineberg and Laurie A. Pearlman (OTA-BP-H-9(11))
12	Assessing Selected Respiratory Therapy Modalities: Trends and Relative Costs in the Washington, D.C. Area: Richard M. Scheffler and Morgan Delaney (OTA-BP-H-9(12))
13	Cardiac Radionuclide Imaging and Cost Effectiveness; William B. Stason and Eric Fortess (OTA-BP-H-9(13))
14	Cost Benefit/Cost Effectiveness of Medical Technologies: A Case Study of Orthopedic Joint Implants; Judith D. Bentkover and Philip G. Drew (OTA-BP-H-9(14))
15	Elective Hysterectomy: Costs, Risks, and Benefits: Carol Korenbrot, Ann B. Flood, Michael Higgins, Noralou Roos, and John P. Bunker (OTA-BP-H-9(15))
16	The Costs and Effectiveness of Nurse Practitioners; Lauren LeRoy and Sharon Solkowitz (OTA-BP-H-9(16))
17	Surgery for Breast Cancer; Karen Schachter Weingrod and Duncan Neuhauser (OTA-BP-H-9(17))
18	The Efficacy and Cost Effectiveness of Psychotherapy; Leonard Saxe (Office of Technology Assessment) (OTA-BP-H-9(18))[d]
19	Assessment of Four Common X-Ray Procedures; Judith L. Wagner (OTA-BP-H-9(19))[e]
20	Mandatory Passive Restraint Systems in Automobiles: Issues and Evidence; Kenneth E. Warner (OTA-BP-H-15(20))[f]
21	Selected Telecommunications Devices for Hearing-Impaired Persons; Virginia W. Stern and Martha Ross Redden (OTA-BP-H-16(21))[g]
22	The Effectiveness and Costs of Alcoholism Treatment; Leonard Saxe, Denise Dougherty, Katharine Esty, and Michelle Fine (OTA-HCS-22)
23	The Safety, Efficacy, and Cost Effectiveness of Therapeutic Apheresis; John C. Langenbrunner (Office of Technology Assessment) (OTA-HCS-23)
24	Variation in Length of Hospital Stay: Their Relationship to Health Outcomes; Mark R. Chassin (OTA-HCS-24)
25	Technology and Learning Disabilities; Candis Cousins and Leonard Duhl (OTA-HCS-25)
26	Assistive Devices for Severe Speech Impairments; Judith Randal (Office of Technology Assessment) (OTA-HCS-26)
27	Nuclear Magnetic Resonance Imaging Technology: A Clinical, Industrial, and Policy Analysis; Earl P. Steinberg and Alan Cohen (OTA-HCS-27)
28	Intensive Care Units (ICUs): Clinical Outcomes, Costs, and Decisionmaking; Robert A. Berenson (OTA-HCS-28)
29	The Boston Elbow; Sandra J. Tanenbaum (OTA-HCS-29)
30	The Market for Wheelchairs: Innovations and Federal Policy; Donald S. Shepard and Sarita L. Karon (OTA-HCS-30)
31	The Contact Lens Industry: Structure, Competition, and Public Policy; Leonard G. Schifrin and William J. Rich (OTA-HCS-31)
32	The Hemodialysis Equipment and Disposables Industry; Anthony A. Romeo (OTA-HCS-32)
33	Technologies for Managing Urinary Incontinence; Joseph Ouslander, Robert Kane, Shira Vollmer, and Melvyn Menezes (OTA-HCS-33)
34	The Cost Effectiveness of Digital Subtraction Angiography in the Diagnosis of Cerebrovascular Disease; Matthew Menken, Gordon H. DeFriese, Thomas R. Oliver, and Irwin Litt (OTA-HCS-34)
35	The Effectiveness and Costs of Continuous Ambulatory Peritoneal Dialysis (CAPD) William B. Stason and Benjamin A. Barnes (OTA-HCS-35)
36	Effects of Federal Policies on Extracorporeal Shock Wave Lithotripsy Elaine J. Power (Office of Technology Assessment) (OTA-HCS-36)
37	Nurse Practitioners, Physician Assistants, and Certified Nurse-Midwives: A Policy Analysis; (OTA-HSC-37)

---

[a] Available for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC, 20402, and by the National Technical Information Service, 5285 Port Royal Rd., Springfield, VA, 22161. Call OTA's Publishing Office (224-8996) for availability and ordering information.

[b] Original publication numbers appear in parentheses.

[c] The first 17 cases in the series were 17 separately issued cases in *Background Paper #2: Case Studies of Medical Technologies*, prepared in conjunction with OTA's August 1980 report *The Implications of Cost-Effectiveness Analysis of Medical Technology*.

[d] Background Paper #3 to *The Implications of Cost-Effectiveness Analysis of Medical Technology*.

[e] Background Paper #5 to *The Implications of Cost-Effectiveness Analysis of Medical Technology*.

[f] Background Paper #1 to OTA's May 1982 report *Technology and Handicapped People*.

[g] Background Paper #2 to *Technology and Handicapped People*.

OTA Project Staff for Case Study #37
Nurse Practitioners, Physician Assistants, and Certified Nurse-Midwives: A Policy Analysis

Roger C. Herdman, *Assistant Director, OTA*
Health and Life Sciences Division

Clyde J. Behney, *Health Program Manager*

Gloria Ruby, ***Project Director***

Steven Sisskind, *Research Assistant*[*]

Virginia Cwalina, *Administrative Assistant*

Diann G. Hohenthaner, *P.C. Specialist*

Carol A. Guntow, *Secretary/Word Processor Specialist*

Principal Contractor

Edward G.Brooks, University of North Carolina, Chapel Hill, NC

Contractors

Louis P. Garrison, The Project Hope Health Sciences Education Center, Millwood, VA

Anne Meadows, Washington, DC (Editing)

---

[*] From July to October 1986.

Advisory Panel—Nurse Practitioners, Physician Assistants, and Certified Nurse-Midwives: A Policy Analysis

Rosemary Stevens, *Chair*
Department of History and the Sociology of Science
University of Pennsylvania, Philadelphia, PA

Walter H. Caulfield
Kaiser Permanente
Oakland, CA

Philip D. Cleveland
Family Medicine Spokane
Spokane, WA

Lynn Etheredge
Health Policy Consultant
Washington, DC

Willis Goldbeck
Washington Business Group on Health
Washington, DC

Sandra Greene
Health Economics Research
Blue Cross/Blue Shield of North Carolina
Durham, NC

Hurdis Griffith
Robert Wood Johnson Fellow
Institute of Medicine
National Academy of Sciences
Washington, DC

Charles G. Huntington
Hermon Medical Group
Hermon, NY

Lauren LeRoy
Physician Payment Review Commission
Washington, DC

Kathy Lohr
The Rand Corp.
Washington, DC

Ruth Lubic
Maternity Center Association
New York, NY

Michael R. Pollard
Office of Policy Analysis
Pharmaceutical Manufacturers' Association
Washington, DC

Patricia A. Prescott
School of Nursing
University of Maryland
Baltimore, MD

Judith Rooks
Consultant
Portland, OR

George M. Ryan
Department of Obstetrics and Gynecology
College of Medicine
University of Tennessee
Memphis, TN

Richard M. Scheffler
Health Policy and Administration Program
School of Public Health
University of California
Berkeley, CA

Henry M. Seidel
School of Medicine
The Johns Hopkins University
Baltimore, MD

Gerry Shea
Health Care Division
Service Employees International Union
Washington, DC

Barbara Warden
National Consumers' League
Washington, DC

Ivan Williams
Kellogg Center
Montreal General Hospital
Montreal, Quebec

NOTE: OTA appreciates and is grateful for the valuable assistance and thoughtful critiques provided by the advisory panel members. The panel does not, however, necessarily approve, disapprove, or endorse this report. OTA assumes full responsibility for the report and the accuracy of its contents.

Contents

Page

CHAPTER 1: SUMMARY AND POLICY CONCLUSIONS 3
Introduction 3
  Background and Scope of the Case Study 3
  Organization of the Case Study 4
Summary 5
  Contributions of Nurse Practitioners, Physician Assistants, and Certified Nurse-Midwives 5
  Effects of Changing Payment Methods 6
Policy Conclusions 10
Addendum: Definitions and Descriptions 12

CHAPTER 2: QUALITY OF CARE 17
Indicators of Quality 17
  Comparisons With Physicians 17
  Patients' Satisfaction 18
  Physicians' Acceptance 18
Methodological Problems of Studies 18
Quality of Nurse Practitioners' Care 19
  Comparisons With Physicians 19
  Patients' Satisfaction 19
  Physicians' Acceptance 21
Quality of Physician Assistants' Care 22
  Comparisons With Physicians 22
  Patients' Satisfaction 22
  Physicians' Acceptance 23
Quality of Certified Nurse-Midwives' Care 23
  Comparisons With Physicians 23
  Patients' Satisfaction 24
  Physicians' Acceptance 24
Summary 25

CHAPTER 3: ACCESS TO CARE 29
Nurse Practitioners' Contribution to Access to Care 30
Physician Assistants' Contribution to Access to Care 32
Certified Nurse-Midwives' Contribution to Access to Care 33
Summary 34

CHAPTER 4: PRODUCTIVITY, COSTS, AND EMPLOYMENT 39
Scope of Professional Practice 39
  Services Provided by Nurse Practitioners and Physician Assistants 39
  Services Provided by Certified Nurse-Midwives 40
Productivity 40
  Nurse Practitioners' and Physician Assistants' Productivity 41
  Certified Nurse-Midwives' Productivity 43
Costs and Employment 44
  Costs and Benefits of Training Nurse Practitioners, Physician Assistants, and Certified Nurse-Midwives 44
  Costs and Benefits of Private Employment of Nurse Practitioners, Physician Assistants, and Certified Nurse-Midwives 46

Contents—continued

Page

Current Employment: Settings and Trends ... 47
  Nurse Practitioners' and Physician Assistants' Employment ... 47
  Certified Nurse-Midwives' Employment ... 48
Summary ... 49

CHAPTER 5: PAYMENT ISSUES ... 53
Effects of Modifying Payment for Services of Nurse Practitioners, Physician Assistants, and Certified Nurse-Midwives ... 54
  Effects on Independent Practices of Nurse Practitioners and Certified Nurse-Midwives ... 54
  Effects on Physicians' Practices ... 57
  Effects on Health Maintenance Organizations ... 58
  Effects on Hospitals ... 58
  Effects on Nursing Homes ... 59
The Changing Context of Health Care ... 60
  Financing ... 60
  Supply of Physicians ... 60
  Delivery Sites and Organizations ... 61
  Effects of Changes in the Health-Care Environment on Nurse Practitioners, Physician Assistants, and Certified Nurse-Midwives ... 62
Summary ... 64

APPENDIX A.—METHODS AND ACKNOWLEDGMENTS ... 69

APPENDIX B.—PAYMENT FOR THE SERVICES OF NURSE PRACTITIONERS, PHYSICIAN ASSISTANTS, AND CERTIFIED NURSE-MIDWIVES ... 71

REFERENCES ... 79

Tables

Table No. *Page*
1-1. Coverage and Direct Payment for Services of Nurse Practitioners, Physician Assistants, and Certified Nurse-Midwives ... 7
1-2. Comparison of Nurse Practitioners, Physician Assistants, and Certified Nurse-Midwives ... 13
2-1. Equivalence in Quality of Care Provided by Nurse Practitioners (NPs) and Physicians (MDs) ... 20
2-2. Difference in Quality of Care Provided by Nurse Practitioners (NPs) and Physicians (MDs) ... 21
2-3. Percentage of U.S. Resident Certified Nurse-Midwives by Type of Organization, 1976-77 and 1982 ... 25
5-1. Selected Alternatives to Traditional Health-Care Delivery ... 62
B-1. Coverage and Direct Payment for Services of Nurse Practitioners, Physician Assistants, and Certified Nurse-Midwives ... 72

Figure

Figure No. *Page*
3-1. Distribution of Physician Assistants by Size of Community ... 32

Chapter 1

Summary and Policy Conclusions

Chapter 1

Summary and Policy Conclusions

INTRODUCTION

The use of nurse practitioners (NPs) and physician assistants (PAs) to provide primary health care traditionally provided only by physicians developed during the 1960s in response to a perceived shortage and maldistribution of physicians. Societal support for this innovation in the delivery of health-care was based on the potential for NPs and PAs to improve access and to lower costs while maintaining the quality of care. At about the same time the number of certified nurse-midwives (CNMs),[1] who had been providing health care for some 30 years, began to increase substantially.

In the past two decades, the ranks of NPs, PAs, and CNMs and their responsibilities for providing care to patients have increased, despite the resistance these practitioners have encountered in their attempts to assume more prominent or more independent roles in delivering health care. Today, approximately 15,400 NPs, 16,000 PAs, and 2,000 CNMs are practicing in the United States.

Changes in the health-care environment have altered the forces that spurred the development and growth of these groups of providers. The health-care sector has become increasingly competitive as the supply of physicians has grown and as the proportion of physicians practicing in the primary-care specialties has decreased. New forms of organization for the delivery of medical care have emerged. Concern over the rapidly rising costs of health care has grown, and new methods of paying for hospitals' inpatient services have been implemented. All of these changes have implications for the roles NPs, PAs, and CNMs will play in the future, and for the quality, accessibility, and costs of health care.

As the health-care delivery system evolves, NPs, PAs, and CNMs are exploring ways to overcome several obstacles, such as unsupportive physicians, restrictive State laws and regulations, and the inaccessibility and cost of malpractice insurance. Although these problems are significant (see box 1-A), they are beyond the scope of this study, which focuses on another major barrier—limited third-party payment for the services of NPs, PAs, and CNMs.

Background and Scope of the Case Study

This case study was prepared in response to a request by the Senate Committee on Appropriations to update a previous OTA case study, "The Cost and Effectiveness of Nurse Practitioners." The committee also requested that OTA address the extent to which various Federal health-care programs and private third-party payers pay for the services of NPs and CNMs. Of particular interest to the committee were the issues of coverage (i.e., authorization for payment) and direct payment (i.e., payment to NPs and CNMs) for their services.[2] The committee also requested that OTA review the evidence on the quality and costs of the care NPs and CNMs provide. The analysis also addresses PAs because their historical background and current roles are similar to that of NPs, and because information on NPs often overlaps with information on PAs.

In considering NPs and PAs, the study focuses on the large majority who provide primary care, although some attention is given to the roles of NPs and PAs in nonprimary-care settings. No distinction is made between primary-care PAs and PAs trained in Medex programs specifically to provide primary care to underserved populations.

---

[1] This case study uses the word *certified* to distinguish formally trained and certified nurse-midwives from lay midwives, who may or may not be nurses and who have informal training in midwifery.

[2] The Medicare program and other third-party payers distinguish between coverage and payment. Coverage refers to benefits available to eligible beneficiaries or subscribers; payment refers to the amounts and methods of payment for covered services.

Box 1-A.—Selected Obstacles Faced by Nurse Practitioners, Physician Assistants, and Certified Nurse-Midwives

Physicians' Resistance

The limited acceptance and, in some cases, outright opposition with which some physicians have met NPs, PAs, and CNMs have restricted employment opportunities for these practitioners. Their use is determined by the settings and the supervisors. In some settings (e.g., health maintenance organizations), NPs, PAs, and CNMs are likely to perform the whole range of services for which they were trained. In other settings (e.g., private practices), however, some physicians are apparently reluctant to delegate primary-care tasks.

Legal Restrictions

The restrictions placed on NPs', PAs', and (to some extent) CNMs' practices by State laws and regulations discourage the integration of these providers into the health-care delivery system. Requirements vary widely from State to State with respect to such matters as physicians' supervision, drug prescription, and independent practice. The requirements are often ambiguous and prevent these providers from practicing at levels commensurate with their training. Furthermore, the lack of uniformity and clarity of the laws and regulations may discourage physicians from hiring these providers. The considerable variance reflects disagreement among the States about the competence levels and appropriate roles of NPs, PAs, and CNMs. During the past decade, however, States have generally lowered the legal barriers to NPs', PAs', and CNMs' practice. For example, between 1965 and 1975 no State permitted NPs to prescribe medications; four States did so between 1975 and 1980; 14 more States have done so since 1980. The trend is not universal. An attempt made after 1980 to permit NPs to prescribe drugs was defeated in the California legislature (154).

Inaccessibility and Cost of Malpractice Insurance

The malpractice crisis has affected most health-care practitioners and providers. Insurers have significantly increased premiums, and have refused altogether to underwrite malpractice policies for some practitioners, including CNMs. As a result, an unknown number of CNMs were forced to close their practices, and about 30 (out of 140) birthing centers closed (136). Although progress is being made in obtaining liability insurance for some CNMs—e.g., a consortium has been formed to underwrite insurance for members of the American College of Nurse Midwives—increasing liability insurance premiums, may lead CNMs, obstetricians, and other health professionals to change their practice patterns or to stop practicing entirely.

Limitations on Coverage and Payment for Interpersonal and Preventive Care

Most third-party payers provide little or no coverage for preventive services and interpersonal services, such as health education and counseling, which are integral to the activities of NPs, PAs, and CNMs. The problem affects all health-care providers and has received broader analysis elsewhere. A recently released OTA report, *Payment for Physician Services: Strategies for Medicare,* provides a detailed discussion of the differences in payments for nonprocedural and procedural services.

The central questions the study attempts to answer are:

- What contributions do NPs, PAs, and CNMs make in meeting the Nation's health-care needs?
- How would changing the method of payment for the services of NPs, PAs, and CNMs affect the roles these practitioners would play in the evolving health-care delivery system?
- How would changing the payment method affect health-care costs for patients, third-party payers, and society?

Organization of the Case Study

The case study is organized into five chapters and two appendixes. Chapter 1 presents a summary of the case study and in an addendum defines and describes NPs, PAs, and CNMs. Chapters 2 through 4 discuss the contributions of NPs, PAs, and CNMs to health care. Chapter 2 addresses the quality of care, reviewing studies that compare the care provided by NPs, PAs, and CNMs with that provided by physicians and studies that gauge patients' satisfaction with and physicians' acceptance of the care provided by NPs, PAs, and CNMs. Chapter 3 considers access to health care; and chapter 4 focuses on productivity, costs, and employment. Chapter 5 analyzes what implications various payment modifications would have for the employment and practice of NPs, PAs, and CNMs and for health-care costs; examines the effects new developments in the health-care sector could have on NPs, PAs, and CNMs; and assesses how payment modifications in the context of a rapidly changing health-care system might influence the roles of these practitioners and the costs of health care.

Appendix A describes the method of the study and acknowledges the assistance of the individuals and organizations that reviewed this case study and provided valuable advice on its content. Appendix B presents a detailed description of payment for the services of NPs, PAs, and CNMs by third-party payers in the public and private sectors.

SUMMARY

Understanding how the use of NPs, PAs, and CNMs affects the quality of care, the access to care, the productivity of providers, and the costs of care is crucial for analyzing the effects of alternative policies regarding payment for the services of these providers. Drawing general conclusions is possible, despite the methodological limitations of many studies.

Contributions of NPs, PAs, and CNMs

Direct measurement of the quality of the care provided by NPs, PAs, and CNMs is not possible at this time. Instead, the quality must be gauged by comparing their care with the care provided by physicians; by examining the extent to which patients are satisfied with the care provided by NPs, PAs, and CNMs; and by assessing physicians' acceptance of such care. Many studies that analyze these relationships are methodologically flawed and almost none examine the quality of services provided without physician involvement.

The weight of the evidence indicates that, **within their areas of competence, NPs, PAs, and CNMs provide care whose quality is equivalent to that of care provided by physicians.**[3] Moreover, NPs and CNMs are more adept than phy-

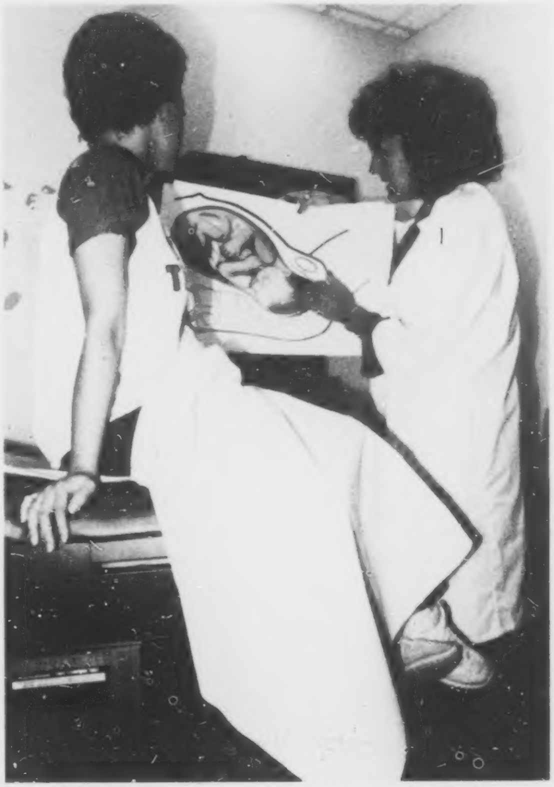


Photo credit: American College of Nurse-Midwives

CNM's improve quality of care and access to care by providing person-oriented services such as health education and counseling.

---

[3] This study examined the quality of the care provided by NPs and PAs in primary-care ambulatory settings and the quality of care provided by CNMs in ambulatory and inpatient settings.

sicians at providing services that depend on communication with patients and preventive actions. The evidence indicates that PAs also perform better than many physicians in supportive-care and health-promotion activities. Patients are generally satisfied with the quality of care provided by NPs, PAs, and CNMs, particularly with the interpersonal aspects of care. Although most physicians who employ these practitioners are satisfied with their performance, physicians' willingness to delegate medical tasks is limited. Many physicians are more comfortable delegating the routine tasks related to primary care, such as taking histories, than the more technical procedures, such as physical examinations. Employment statistics also reflect physicians' acceptance of these practitioners.

Historically, NPs, PAs, and CNMs have been credited with improving the geographic distribution of care, because many of them have been willing to locate in underserved rural and inner-city areas. As a result of increases in the supply of physicians, some physicians are beginning to practice in smaller communities. Although some experts believe that the maldistribution of physician manpower will improve over time, access to primary care is still limited and may persist as a problem in certain geographic areas. How changing patterns in the distribution of primary-care physicians will affect the employment and the practice patterns of NPs, PAs,and CNMs is uncertain, but these practitioners will continue to play valuable roles in underserved areas.

In addition to improving access to care in rural areas, NPs, PAs, and CNMs increase access to primary care in a wide variety of nongeographic settings and for populations not adequately served by physicians. Studies have shown, for example, that NPs increase access to primary care for underserved children in school settings, and elderly patients in nursing homes. CNMs provide effective and low-cost maternity care to underserved, socioeconomically high-risk pregnant women and adolescents. NPs, PAs, and CNMs have also improved access by adding to the scope of primary-care services available to patients. NPs and PAs are competent in guiding individuals through today's complex health-care system and in caring for chronically ill adults and children. Preliminary reports indicate that NPs and PAs also increase access to primary care in other settings, such as, in the home and in correctional institutions, where needed medical care is not always available.

In principle, the scope of NPs' and PAs' practice encompasses most of the primary-care services provided by their physician counterparts. **Productivity studies indicate that NPs and PAs working under physicians' supervision can increase total practice output** by some 20 to 50 percent. Increases in productivity resulting from the use of NPs and PAs vary widely depending on the practice settings, on the responsibilities delegated to these practitioners, on the severity and stability of the patients' illnesses, and on how the physicians choose to use the free time that results from delegating tasks. Although much less information on productivity is available for CNMs than for NPs and PAs, **the degree to which CNMs can substitute for physicians appears to be considerable**.

Indirect evidence indicates these providers could decrease costs to employers and society. Employment levels for NPs, PAs, and CNMs suggest that health-care providers consider these practitioners to be cost-effective substitutes for physicians in delivering many services. From a societal standpoint, training NPs, PAs, and CNMs costs much less than training physicians. **Given that the quality of care provided by NPs, PAs, and CNMs within their areas of competence is equivalent to the quality of comparable services provided by physicians; using NPs, PAs, and CNMs rather than physicians to provide certain services would appear to be cost-effective from a societal perspective.**

Effects of Changing Payment Methods

Although the evidence indicates that NPs, PAs, and CNMs have made positive contributions to the delivery of health care, **these practitioners have not been used to their fullest potential. Major obstacles to the greater employment and appropriate use of NPs, PAs, and CNMs are that most third-party payers do not cover (authorize for payment) the provision by NPs, PAs, and CNMs of many services that are typically and characteristically provided by physicians, and, in those instances where third-party payers do cover**

the services of NPs, PAs, and CNMs, the payments are most often indirect (i.e., to the employing physicians or institutions) rather than direct (i.e., to the NPs or CNMs). PAs have not sought direct payment.

Most NPs, PAs, and CNMs are employed in organized settings where employment is usually not contingent upon coverage. However, the reluctance of some physicians in private practice to hire these practitioners stems partly from uncertainties about payment for their services. NPs and CNMs in independent practices must depend on patients' out-of-pocket payments. Some third-party payers in the public and private sectors cover the services of NPs, PAs, and CNMs (see table 1-1). Coverage and direct payment has been mandated most often for CNMs, and to some extent they have been able to operate with suitable physician collaboration.

The effects of extending coverage for the services of NPs, PAs, and CNMs and paying directly for the services of NPs and CNMs would undoubtedly be influenced by the markets for their services. The health-care system is currently undergoing substantial changes in the supply of physicians and in physicians' practice arrangements. Innovations in methods of paying other providers are multiplying. For example, some third-party payers are paying prospectively for hospitals' inpatient services (e.g., Medicare is paying on the basis of diagnosis related groups[4]), and capitation[5] is a growing mode of payment. These changes, along with the fact that an increasing proportion of the population is aged 65 or older, and thus in need of significant amounts of health-care services, have major implications for the employment and use of NPs, PAs, and CNMs and for health-care costs. The uncertainty surrounding the markets for the services of NPs, PAs, and CNMs in a health-care system in a state of flux makes it difficult to predict the effect of payment changes.

---

[4] Diagnosis related groups are groupings of diagnostic categories drawn from the International Classification of Diseases and modified on the basis of surgical procedures, patients' age, significant comorbidities or complications, and other relevant criteria. DRGs are the case-mix measure mandated for Medicare's prospective hospital payment system by the Social Security Amendments of 1983 (Public Law 98-21).

[5] Capitation payment is prospective payment of a per-capita amount for all services received by an enrollee or beneficiary during a given period.

Table 1-1.—Coverage and Direct Payment for Services[a] of Nurse Practitioners, Physician Assistants, and Certified Nurse-Midwives

	Nurse practitioners		Physician assistants		Certified nurse-midwives	
Third-party payer	Coverage	Direct payment	Coverage	Direct payment	Coverage	Direct payment
Medicare:						
Part A	No	No	No	No	No	No
Part B	No	No	No[b]	No	No	No
HMOs[c]	Yes	NA	Yes	NA	Yes	NA
State Medicaid programs[d]	Some programs	A few programs	Some programs	None	Almost all programs	Almost all programs
Medicare and Medicaid:						
Rural Health Clinics	Yes	No	Yes	No	Yes	No
CHAMPUS[e]	Yes	Yes	No	No	Yes	Yes
FEHBP[f]	7 plans	7 plans	6 plans	6 plans	20 plans	20 plans
Private insurance[g]	In some States	In some States	No	No	In some States	In some States

NA = not available.

[a] Services that are typically and characteristically provided by physicians.

[b] During the publication of this case study, the Omnibus Reconciliation Act of 1986 (Public Law 99-509) was enacted. The act modifies Part B of Medicare and authorizes payment for (covers) services of physician assistants working under the supervision of physicians in hospitals, skilled nursing facilities, intermediate-care facilities, and as an assistant at surgery. The payment is indirect and at levels lower than physicians would receive for providing comparable services.

[c] Health maintenance organizations.

[d] State Medicaid programs have the option of including NP and PA services in their State Medicaid Plans. Congress mandated coverage of CNMs' services in 1980. As of January 1985, all States in which CNMs practiced either were complying with the law (Public Law 96-499) or were considering changes in their Medical plans to comply with the law.

[e] Civilian Health and Medical Program of the Uniformed Services.

[f] Federal Employees Health Benefit Program. FEHBP has 21 fee-for-service plans, some of which authorize payment to NPs, PAs, and CNMs.

[g] Whether State laws and regulations require or permit insurance coverage and direct payment for the services of NPs, PAs, and CNMs

SOURCE: Office of Technology Assessment, 1986.

The effect of modifying the payment system to cover and allow direct payment for the service of NPs, PAs, and CNMs depends on their employment setting. Such changes could spur the growth of NPs' and CNMs' independent fee-for-service practices[6] and joint practices with physicians, to the extent permitted under State laws and regulations. Because CNMs are currently less limited than NPs by payment limitations of third-party payers, NPs would benefit most from coverage and direct payment.

Even with coverage and direct payment, the number of NPs and CNMs engaging in independent practice should be expected to remain very small. In addition to the restriction imposed by State laws and regulations, there are many difficulties in undertaking such a practice, including high startup costs, obtaining malpractice insurance, and high premium malpractice insurance rates. NPs in independent practices also depend on physician referrals to establish a clientele. Concerns expressed by physicians and the current competitive market suggest that such referrals might not be forthcoming. Independent practices of CNMs are limited by physician concern with competition and difficulty in obtaining physician collaboration and hospital privileges. Although many patients might continue to prefer a physician, direct payment would give patients the choice of a wider range of providers.

One possible drawback of coverage and direct payment is that additional covered providers might increase the volume of services provided and increase costs to patients and third-party payers. Although the sparsity of conclusive data makes it difficult to allay this concern, the increasing emphasis most third-party payers place on monitoring the use of services might help control any increase in the volume of services provided.

Because of their potentially small number, NPs and CNMs in independent practice might not seriously affect costs. However, NPs and CNMs in administratively independent practices could potentially lower costs to third-party payers, patients, and society. If the provision of services by NPs, CNMs, and physicians did not increase,[7] and if NPs' and CNMs' payment level were lower than those of physicians for comparable services, lower costs for third-party payers would be likely. If the fees to patients reflected the lower payment levels, costs to patients' and society could be lower. For primary care services, such as office visits, savings to patients would be small, because the fee for the service is small, and because insurance usually covers most of the providers' fees. Savings for maternity care could be important, because the care itself is costly and insurance coverage is incomplete. Patients, third-party payers, and society could have lower costs if the total costs of care provided by these practitioners was lower than the total costs of care provided by physicians for similar medical conditions.

NPs and CNMs in independent practices would benefit by being able to offer lower prices as a competitive strategy. Individual practice association (IPA)-model health maintenance organizations (HMOs), which contract with individual physicians for services, might turn to NPs as contractors for primary-care services and CNMs as contractors for maternity services. Preferred provider organizations (PPOs), which contract with providers to supply services at discounted fees, might also consider NPs and CNMs as contractors. These developments, however, would be limited by the increasing availability of primary-care physicians (including obstetricians) and other barriers (see box 1-A). Moreover, physicians appear to be engaging in price competition as a result of the changing health-care market.

How coverage for NPs, PAs, and CNMs would affect their employment and appropriate use by fee-for-service physicians' practices is uncertain, because many variables affect physicians' decisions to employ these practitioners and to delegate tasks commensurate with the training of these providers. If NPs', PAs', and CNMs' services were authorized for payment, some physicians might be encouraged to employ and integrate these providers into their practices, knowing that practices that employ NPs and PAs are better able to offer competitive prices and broader ranges of services than are other practices (17). Some physicians might find it advantageous to hire new physicians, rather than NPs, PAs, or CNMs, because the rate at which physicians' income is growing is decreasing, and new physicians are expressing interest in salaried positions and are willing to work for less money than established physicians earn. Employing physicians, rather than NPs, PAs, or CNMs, might make some practices more competitive, because of the status patients often confer on physicians. Physicians with declining patient bases might not be able to justify taking on additional providers and expenses and might compete by increasing the time spent with individual patients.

---

[6] Such practices would be administratively independent. Administratively independent practices are not clinically independent from physicians when NPs and CNMs are performing delegated medical tasks. In addition to the nursing profession's agreement to clinical collaboration with physicians, State laws and regulations that proscribe the scope of practice of NPs and CNMs and specify requirements for physician supervision serve as a more formal control on clinical independence. NPs and CNMs may legally be clinically independent from physicians when performing nursing tasks.

[7] No direct evidence is available as to how coverage and direct payment would affect the volume of services provided by NPs and CNMs. Although research on physicians' influence on the volume of services has been conducted for many years, none of the studies unequivocally proves the magnitude or even the existence of physicians' ability to control the volume of services (246).

The advantages of extending coverage for NPs', PAs', and CNMs' services in fee-for-service settings is apparent in certain settings, for certain populations and where there are demonstrated shortages of trained personnel. For example, rapid growth in the elderly population and in the use of nursing-home care has raised concerns about the quality and costs of such care. Not only has physicians' disinterest in visiting elderly residents of nursing homes (166) been established, but there are very few physicians trained in geriatrics (126). Furthermore the elderly institutionalized population is growing. Although more and better physician care for these patients may be available in the future, their ability to furnish all the health needs of this group is questionable. The geriatric component of many of the training programs of NPs and PAs has been increased and the 1- to 2-year length of NP and PA training programs makes NPs and PAs readily available for providing care. NPs and PAs have the demonstrated ability to provide care for a population with chronic problems and functional disabilities. Coverage would permit NPs and PAs[8] to legally provide the primary care services for which they are trained and licensed—services that many nursing homes find difficult to supply.

Photo credit: American Nurses Association

Extending coverage for NPs to provide primary care services to elderly nursing home residents would alleviate a demonstrated shortage of trained personnel for that population.

If coverage were extended, NPs and PAs would most likely provide nursing home visits as employees of physicians' practices or as team members in group practices to provide nursing-home visits. If NPs were paid directly, they could function as independent practitioners, supplying primary-care services to nursing homes. Except when more intensive care can be substantiated, the Medicare program currently limits the frequency of physicians' visits to nursing homes, so third-party payer costs in this setting might not be affected as long as payment levels were the same for NPs and PAs as for physicians. Total costs to third-party payers would probably decrease because visits to nursing homes by teams of physicians and NPs or PAs would decrease the use of hospital facilities (128,155,257).[9]

---

[8] During the publication of this case study, the Omnibus Reconciliation Act of 1986 (Public Law 99-509) was enacted. The act changes the Medicare law and authorizes the coverage of the services furnished by PAs under the supervision of physicians in skilled nursing facilities and intermediate care facilities in States where PAs are legally authorized to perform the services. This provision takes effect Jan. 1, 1987. Payments, which go to the employer are 85 percent of the prevailing charges of physician services for comparable services provided by nonspecialist physicians.

[9] As app. B describes, a number of other Medicare and Medicaid regulations specific to nursing homes limit the roles of NPs and PAs and specify services that must be performed by physicians in order for the nursing homes' services to be covered. In addition to permitting coverage under Medicare and Medicaid, amendments to these regulations would be required in order to encourage the employment and appropriate use of NPs' and PAs' services in this setting.

Coverage for the services of NPs and PAs could also be advantageous for home-bound elderly patients and for allowing pediatric NPs to care for chronically ill children at home. Medical teams of pediatricians and PNPs—with the PNPs providing routine care, teaching children at home, and monitoring the program—have been shown to be effective in minimizing the social and psychological consequences of chronic illness (234). CNMs could be covered for the maternity care of pregnant disabled women, in cases where the disabling condition did not complicate the pregnancy and birth process. Such women might benefit from the individualized care that CNMs typically provide.

Coverage would be advantageous in rural areas where the lack of medical personnel is a persisting problem. Although the Rural Health Clinics Services Act of 1977 extended coverage to NPs, PAs, and CNMs working in rural clinics, not all residents of such areas have access to clinics. Coverage for NPs, PAs, and CNMs might encourage their use by physicians in fee-for-service practices in rural areas who, because of fewer numbers, must see considerably more patients and work longer hours than their urban counterparts. Furthermore, direct payment might encourage qualified NPs and CNMs to move into unserved and underserved areas to expand access to heath care.

Competition among health-care organizations and the growth of HMOs—which have employed and used NPs, PAs, and CNMs extensively in the past—augurs larger roles for these providers in the health-care system as employees of HMOs. Capitation, the method used to pay most HMOs, does not require providers to bill for specific services, and the services provided by NPs, PAs, and CNMs in such settings are, for the most part, already covered by public and private third-party payers. Thus, **coverage and direct payment for the services of these practitioners would not directly affect their employment by HMOs.**

Such employment might diminish, however, if competition leads physicians to accept salaries that are sufficiently low to entice HMOs to employ physicians instead of NPs, PAs, or CNMs. Another factor that might negatively affect HMOs' employment of these practitioners is the increase in the number of IPA-model HMOs. Because they are primarily organized around physicians who usually practice in private offices, IPA-model HMOs are less likely than are large group- or staff-model HMOs to employ these providers. Although the number of IPA-model HMOs has increased, the group- and staff-model HMOs have the greatest number of enrollees.

The data suggest that NPs, PAs, and CNMs offer financial savings to capitated HMOs. An increasingly competitive environment might encourage providers to pass on to consumers the savings generated by the employment and appropriate use of NPs, PAs, and CNMs, which would benefit society.

Providing coverage or direct payment for the services of NPs, PAs, and CNMs would not necessarily affect their employment by hospitals for inpatient care. NPs, PAs, and CNMs who work in hospitals are usually hospital employees, and the hospitals pay their salaries. Furthermore, there is no statutory permission or lack of permission under Medicare or Medicaid for payment of NPs', PAs', or CNM's services as inpatient hospital services when these providers are employed by hospitals. Most other third-party payers are also silent on this issue. With coverage, these services could be billed for as professional services.

POLICY CONCLUSIONS

NPs, PAs, and CNMs have made important contributions to meeting the Nation's health-care needs by:

- improving the quality and accessibility of health-care services; and
- increasing the productivity of medical practices and institutions.

These practitioners have been accepted in a wide range of settings under many different payment schemes, have the potential to reduce health-care costs, and clearly play legitimate roles in the health-care system.

Although NPs, PAs, and CNMs are not employed and used to their fullest potential, many third-party payers in the public and private sectors are gradually lowering the barriers presented by current payment methods and coverage restrictions.

Although Federal third-party payers vary considerably in the extent of their coverage of and payment for the services of these providers, in general, coverage and direct payment is limited (see app. B). Federal third-party payers could be more in step with new and evolving payment practices by liberalizing coverage and payment restrictions for the services of NPs, PAs, and CNMs. A major policy question is the manner of liberalizing coverage and policy restrictions. Coverage could be extended for NPs', PAs', and CNMs' services in all settings or only in certain settings. Direct payment for the services of NPs and CNMs would further remove barriers to practice. (PAs have not sought direct payment.)

How extending coverage for the services of NPs, PAs, and CNMs in all settings would affect their employment and use varies on the setting:

- little change would occur in HMOs and inpatient hospital settings; and
- the effect in physician fee-for-service practice settings is unclear.

Coverage for the services of NPs, PAs, and CNMs by additional payers would have little effect on the employment and use of these providers by HMOs or by hospitals for inpatient care. While important changes in employment opportunities could occur in physician fee-for-service practices, the direction of change is not clear because of the large number of variables that affect physicians' decisions. Since the effect on costs is directly related to the extent of employment, this question also remains unanswered.

Extending coverage for NPs', PAs', and CNMs' services in all settings or limiting coverage for their services to certain settings where health-care services are currently inaccessible or inadequate would benefit certain individuals, such as:

- those in certain locales (geographically underserved rural and inner-city areas);
- those in certain settings (e.g., homes and nursing homes); and
- specific populations (e.g., some disabled pregnant women and some chronically ill patients, both adults and children).

Covering the services of NPs, PAs, and CNMs might encourage physician fee-for-service practices to employ these providers and use them in settings and for populations that are not receiving sufficient and adequate care. Because payment would be to employing physicians, physicians would have the final authority for the employment and the exact nature of NPs', PAs', and CNMs' responsibilities. Physicians would have to recognize the advantages of using NPs, PAs, and CNMs in their practices for providing care to unserved and underserved individuals.

Direct payment as well as coverage for services of NPs and CNMs might enable them to develop independent practices in competition with physician practices. Legal and financial restrictions could be expected to keep the numbers of NPs and CNMs in independent practice very small. Competition from an increasing supply of physicians might offset the gains direct payment would bring to the independent practice of NPs and CNMs.

How adding these practitioners, particularly as independent practitioners, to the health-care system, would affect costs cannot be resolved at this time. The suspicion exists that total costs would increase, but data are not available to answer the question. If costs increased due to an increase in the provision of services, volume controls could be instituted.

If the overall volume of services did not increase, and if the NPs' and CNMs' payment levels were lower than physicians' levels for comparable services, third-party payers' costs might decrease. Patients might realize savings from decreases in the fees for some services. The extent of any savings would depend on what payment levels were established. In any event, patients could choose from a wider range of providers and might have greater access to primary-care services.

Direct payment for the services of NPs and PAs could be limited to certain settings where there are demonstrated shortages of primary—or maternity care services. For example, direct payment might be provided to NPs and CNMs who increase geographic access to care. NPs and CNMs in independent practice may prove a viable solution for meeting the health-care needs of sparsely populated areas that cannot support a physicians' practice. However, limiting direct payment to certain areas and populations may not be an efficient cost containment measure because of the potentially small number of independent practices.

It seems clear that coverage for the services of NPs, PAs, and CNMs in at least some settings could improve health care for segments of the population that are not being served adequately. How coverage would affect costs is unclear, but the long-term result could be notable savings. The effect of direct payment on costs is even less certain, but it might enable NPs and CNMs to practice in unserved and underserved areas to expand access to health care.

ADDENDUM: DEFINITIONS AND DESCRIPTIONS

Descriptions of the general roles of NPs, PAs, and CNMs indicate the similarities and differences of these three types of health practitioners. (See table 1-2 for a comparison of their general characteristics.)

> Today's nurse, operating in an expanded role as a professional nurse practitioner, provides direct patient care to individuals, families and other groups in a variety of settings. . . . The nurse practitioner engages in independent decisionmaking about the nursing needs of clients, and collaborates with other health professionals, such as the physician, social worker, and nutritionist in making decisions about other health needs. The nurse working in an expanded role practices in primary, acute, and chronic health care settings. As a member of the health care team, the nurse practitioner plans and institutes health care programs.
>
> *—GEMNAC, 1979*

> The purpose of the physician assistant in primary care is to help the physician provide personal health service to patients under his care. An assistant works with a supervising physician in performing clinical functions and tasks which prior to the mid-1960s were reserved principally if not solely for performance by the physician.
>
> *—Allied Health Education Directory, 1985*

> [Nurse-midwifery practice is] the independent management of care of essentially normal newborns and women, antepartally, intrapartally, postpartally and/or gynecologically [and] occurs within a health care system which provides for medical consultation, collaborative management, and referral.
>
> *—American College of Nurse-Midwives, 1984*

PAs differ from NPs and CNMs in their working relations with physicians. PAs always work under physicians' supervision, whereas NPs and CNMs work under physicians' supervision, or in collaborative relationships with physicians and other health professionals. Another major difference lies in the training these practitioners undergo. NPs and CNMs are licensed registered nurses[10] who have received advanced training beyond that of other registered nurses. NPs are trained as generalists in the provision of primary care services. They may choose to specialize at the graduate level and deal with specific populations, as do geriatric or pediatric NPs. CNMs receive advanced training in midwifery. PAs, however, are not required to be registered nurses, and the great majority are not. They come from a variety of backgrounds and experiences before training to become PAs. Most PAs have had 3 or more years of college-level education or several years

---

[10] Three types of nursing education lead to registered-nurse licenses: 2-year community-college programs; 3-year hospital-affiliated diploma programs; and 4-year baccalaureate-degree programs. The trend to make nursing education more academic and uniform is reflected in the discontinuation of many hospitals' diploma programs, although this has not resulted in an increased demand for baccalaureate education for nurses.

Table 1-2.—Comparison of Nurse Practitioners, Physician Assistants, and Certified Nurse-Midwives

	Nurse practitioners	Physician assistants	Certified nurse-midwives
Date of first educational program	1966	1965	1931
Approximate number trained	25,000 to 30,000[a]	18,116[b]	3,500[c]
Approximate number employed in field of training[d]	15,433[e]	16,000[f]	2,000[g]
Services	Provide medical services within limits of competence; provide counseling and health-promotion services	Provide medical services as assistants to physicians	Provide full range of prenatal, labor, delivery, and postpartum care; family-planning counseling; and gynecological services
Role	Provide advanced nursing services, including working with clients having complex or multiple needs; provide medical services in collaboration with physicians and other health providers	Provide medical care under supervision of physicians	Provide midwifery services in consultation with physicians; mainly serve low-risk women; increasingly work administratively independent of physicians
Settings	Mainly primary care; trend toward hospitals, long-term care facilities, and other settings	Mainly primary care; trend toward hospitals, long-term care facilities, and other	Hospitals; trend toward birthing centers, health departments, and family planning clinics
Education	Registered nurse with additional training, increasingly at masters level	Special academic and on-the-job training	Registered nurse with additional training, about half at masters level
Approximate average income	$25,975[h]	$27,560[i]	$25,000[j]

[a] Estimated by Denise Gelot, Division of Nursing, Bureau of Health Professions, Health Resources and Services Administration, Public Health Service, U.S. Department of Health and Human Services, Rockville, MD, personal communication, Aug. 20, 1986.

[b] American Academy of Physician Assistants, "AAPA Membership Statistics by Graduation Date," Arlington, VA, May 13, 1986.

[c] Estimated by American College of Nurse-Midwives, Washington, DC, personal communication, Aug. 20, 1986.

[d] The figures for NPs and CNMs are from 1980. Later data from the U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Bureau of Health Professions, Division of Nursing, "1984 National Sample Survey of Registered Nurses," Rockville, MD, indicates that the aggregate number of employed NPs and CNMs is 18,642.

[e] National Sample Survey of Registered Nurses, November 1980, in "Registered Nurse Population and Overview," U.S. Department of Health and Human Services, Public Health Service, Health Research Services Administration, Publication No. HRS-P-OD-83-1, November 1982.

[f] Estimated by Gretchen Shafft, American Academy of Physician Assistants, Arlington, VA, personal communication, Sept. 15, 1986.

[g] Estimate from Kathy Michels, Assistant Director, Congressional and Agency Relations, American Nurses' Association, Washington, DC, personal communication, June 17, 1986.

[h] U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Bureau of Health Professions, Division of Nursing, "1984 National Sample Survey of Registered Nurses," Rockville, MD.

[i] American Academy of Physician Assistants, *1984 Physician Assistant Masterfile Survey* (Arlington, VA: 1984).

[j] American College of Nurse-Midwives, Washington DC, personal communication, Aug. 20, 1986.

SOURCE: Office of Technology Assessment, 1986.

of experience in health-related fields, although these are not entrance requirements for the training programs.

Certification is available to all three types of health practitioners and is required for CNMs. Certification is offered to registered nurses by the American Nurses Association, by nurse-specialty associations and by some academic nursing-education programs. An NP can be certified after completing either an NP-master's program or an NP-certificate program. Master's degree programs require applicants to have baccalaureate degrees and registered-nurse licenses, and such programs entail an average of more than a year of additional training. Certificate programs are generally a year long and require registered-nurse licenses. CNMs are certified according to the requirements of the American College of Nurse-Midwives. PAs are certified by the National Commission of Certification of PAs.

CNMs are trained to provide care for essentially normal expectant mothers and to handle abnormal cases by referring the patients to physicians or by consulting physicians or working jointly with them. Specific functions include providing prepartum care, managing normal deliveries, providing postpartum care, providing gynecological care, providing care to normal newborns and infants, and providing family-planning services.

NPs are taught to perform functions beyond those of traditional nursing and to assume responsibility for some of the care usually provided by physicians (see box 1-B). PAs are also trained to provide some of the services typically provided by physicians (see box 1-B). PAs are trained in

Box 1-B.—Functions of Nurse Practitioners and Physician Assistants

Nurse Practitioners

The nurse practitioner is the professional nurse trained to provide the full range of primary-care services in the community setting. The American Nurses Association described the NPs' functions referred to in the original Nurse Training Act of 1971 as:

> . . . obtaining a health history; assessing health-related status; entering a person into the health care system; sustaining and supporting persons who are impaired, infirm, or ill and during programs of diagnosis and therapy; managing a medical care regimen for acute and chronically ill patients within established standing orders; aiding in restoring persons to wellness and maximum function; teaching and counseling persons about health and illness; supervising and managing care regimens for normal pregnant women; helping parents in guidance of children with a view to their optimal physical and emotional development; counseling and supporting persons with regard to the aging process; and supervising assistants to nurses (46).

Physician Assistants

Physician assistants (PAs) are skilled members of the health-care team who, working dependently with physicians and under their supervision, provide diagnostic and therapeutic patient care (255). They are trained to obtain a patient's medical history, perform comprehensive physical examinations and minor surgical procedures, order and complete routine diagnostic tests, develop diagnostic and management plans, provide basic treatment for persons with common illnesses, and respond appropriately to life-threatening emergencies. PAs are also trained to counsel patients on preventive health-care topics and to facilitate the referral to the community's health and social service agencies when appropriate (20). The curricula of the surgeon's assistant programs are structurally similar to programs for primary care PAs, except they place greater emphasis on clinical and technical skills related to surgical patient care . . . Surgeon assistants (graduates of specialized training programs) and PAs with training in surgery often act as first or second assistants in major surgery (255).

interpersonal skills, but not to the extent that NPs and CNMs are. Indeed, counseling and health education are traditional dimensions of nursing practice. Although many PAs pursue medical and surgical subspecialties, this study focuses on those PAs who are primary-care practitioners in ambulatory settings.

The roles PAs and NPs play depend on their work settings. In some settings, no functional distinctions between NPs and PAs exist; in other settings the two types of providers function very differently. NPs, as registered nurses, perform the full scope of nursing practice in addition to performing medical tasks, whereas PAs only perform medical tasks. In reality, NPs and PAs often perform the same roles, and evaluations often focus on NPs and PAs collectively, rather than on either NPs or PAs alone.

Chapter 2

Quality of Care

Chapter 2

Quality of Care

Because health care encompasses both technical care and the art of care (146), the quality of both must be assessed in determining the quality of the care provided by nurse practitioners (NPs), physician assistants (PAs), and certified nurse-midwives (CNMs). Technical care comprises the diagnostic and therapeutic components of care; the art of care refers to the environment in which care is provided and the provider's manner and behavior in caring for and communicating with the patient (146).

INDICATORS OF QUALITY

Current methods of evaluating the quality of care provided by NPs, PAs, and CNMs are inexact. Structure, process, and outcome of care are traditionally used to measure the quality of care provided by physicians (70).[1] The quality of care provided by NPs, PAs, and CNMs is often evaluated by comparing the process and outcome[2] of the care they provide with the process and outcome of the care physicians deliver. Other accepted indicators of the quality of care provided by NPs, PAs, and CNMs are patients' satisfaction[3] and, to a lesser extent, physicians' acceptance.

Comparisons With Physicians

The quality of care provided by NPs, PAs, and CNMs can be compared to the quality of care provided by physicians with regard to only those functions that both physicians and NPs, PAs, and CNMs usually perform. Comparisons based on functions outside the scope of NPs', PAs', and CNMs' training and practice, or on functions that physicians do not usually perform are unreasonable.

Comparison studies are biased against NPs, PAs, and CNMs because the studies assume the medical model as the standard—physician care is considered the standard for care. This standard may be appropriate for measuring the technical quality of the tasks that NPs, PAs, CNMs, and physicians perform. But the medical model may be less suitable for measuring the interpersonal quality or art of care, which is more characteristic of care provided by NPs, PAs, and CNMs than of that provided by physicians. Indeed, health promotion, teaching, and counseling are the essence of nursing education and are also stressed in the curricula for training NPs and CNMs. PAs also receive training in interpersonal skills, but to a lesser extent. Physicians can legally provide health education and counseling, but the training in these skills varies among medical specialties and medical schools. Among physicians, only family practitioners and psychiatrists receive extensive training in interpersonal skills, although some physicians in all specialties provide personal care.

Some other comparison studies are biased in favor of NPs, PAs, and CNMs. In studies where patients are not randomly assigned, patients assigned to NPs, PAs, and CNMs are, on the whole, healthier than patients who see physicians exclusively; and either the practitioners or patients can decide to consult physicians at any time. Of those patients who consult physicians, those who choose to remain exclusively under the physicians' care most likely are less healthy than those who return to the NPs, PAs, or CNMs.

---

[1] Structural measures evaluate descriptive characteristics of facilities and providers, e.g., the soundness of a building and the board certification of a physician. Process measures evaluate what a provider does to and for a patient, e.g., order a cardiogram for a patient with chest pain. Outcome measures evaluate the result of patient care, i.e., health status. Although outcome measures are the most accurate available measure of quality, they are difficult to obtain. (For a discussion of the problems associated with measuring the outcome of care, see OTA's 1986 report, *Payment for Physician Services: Strategies for Medicare* (246).)

[2] The structural measures applicable to NPs, PAs, and CNMs include their certification, and the accreditation of their training programs and of their continuing education programs.

[3] Although acceptance and satisfaction are not synonymous, the literature uses the words interchangeably in describing positive responses to NPs, PAs,and CNMs and the care they provide.

Patients' Satisfaction

Looking to patients' satisfaction as an indication of quality of care reflects an increasing sensitivity to patients' interests and concerns and a recognition that outcomes partly depend on patients' attitudes. Little evidence, however, suggests that patients' satisfaction positively correlates with favorable technical outcomes (70). Patients' judgments may be based less on the therapies' success than on the interpersonal aspects of care—for example, on how courteously patients felt they were treated, how they assessed the value of the advice they received, on how much time they spent with the providers, and on how their emotional states changed (267). Nonetheless, if patients are dissatisfied with the services they receive, part of the reason for their dissatisfaction may be that their expectations have not been fulfilled.

Malpractice insurance premium rates and malpractice claims can also be used to judge patients' satisfaction. The comparison between physicians and NPs, PAs, and CNMs is crude because the number and scope of services provided by physicians differ from those provided by NPs, PAs, and CNMs. The interpersonal aspects of care appear to influence malpractice cases: physicians who maintain good relations with their patients tend to be sued less frequently than physicians who lack rapport with their patients (185).

Physicians' Acceptance

Some authorities reject the notion that physicians' acceptance of NPs, PAs, and CNMs indicates that the care they provide is good. Other authorities believe that physicians' acceptance of such providers indicates good care to the extent that physicians evaluate the care given by the providers against the standard of physicians' care. Physicians' evaluations of the care provided by NPs, PAs, and CNMs in their employ, however, might be affected by the physicians' fiscal interests. Physicians pleased with the financial results of employing NPs, PAs, or CNMs might view these providers favorably, whereas physicians displeased with the financial results might show their displeasure in negative assessments of the work of these providers. Other subjective factors, such as gender or personal acquaintance, might influence the degree to which physicians accept NPs, PAs, and CNMs. Competition from NPs and CNMs in independent practice, for example, certainly influences physicians' acceptance of such practitioners.

METHODOLOGICAL PROBLEMS OF STUDIES

One or more common methodological problems affect most studies of the quality of care provided by NPs, PAs, and CNMs. The problems include using small samples, focusing on short-term outcomes, using nonrandomized study populations, applying single evaluation criteria, using incomplete and unstandardized medical records data, and choosing nonrepresentative samples or sites. Some studies, because they were conducted by educators and other proponents of NPs, PAs, and CNMs, might be biased in favor of the care given by these providers.[4]

Study designs contain other weaknesses. Some studies compare the processes and outcomes of care provided by NPs, PAs, and CNMs with the processes and outcomes of care provided by house staff rather than by experienced physicians. Study designs that compare only medical tasks as performed by physicians with tasks performed by NPs and CNMs are incomplete because they ignore the advanced nursing responsibilities that NPs and CNMs also fulfill.

There are a few well-conducted, randomized, controlled trials that are valid within their own designs. The conclusions of these trials, as well as other less rigorous studies, can be generalized—applied to other populations and settings—but only in a limited way. Many studies report on only a few NPs, PAs, or CNMs in only one setting, which limits the applicability of the findings for other providers and other settings.

---

[4] No bias against NPs, PAs, and CNMs was apparent in the studies examined for this review.

Some of the studies of patients' satisfaction and physicians' acceptance are opinion surveys that, depending on the rigor of design and execution, are more or less flawed. Problems include misinterpretation of questions by respondents, investigators' bias in framing questions, and reliance on the respondents' memories. Little attention has been given to the systematic development of the questionnaires or measuring scales used by investigators.

QUALITY OF NURSE PRACTITIONERS' CARE

Comparisons With Physicians

Reviews of comparison studies (230,242) and individual studies comparing NPs and physicians find that the quality of care provided by NPs functioning within their areas of training and expertise tends to be as good as or better than care provided by physicians (50,51,72,104,186,199,231).

In some cases, the quality of NP care is equivalent to physician care (see table 2-1). For example, NPs generally resolve patients' acute problems as well as physicians (130,139), and the functional status of patients treated by NPs and physicians is equivalent (212). Spitzer (231) found no difference between NPs and physicians in the adequacy of their prescribing practices. Other researchers found that NPs prescribe and use medications less frequently than do physicians, and that NPs tend to prescribe only well-known and relatively simple drugs (29,204,225). The studies did not ascertain whether the differences in the prescribing habits of physicians and NPs stem from differences in patient mixes, prescribing philosophies, or other causes.

The quality of NPs' care differs from that of physicians' care in other instances (see table 2-2). NPs appear to have better communication, counseling, and interviewing skills than physicians have (84,104,178), a conclusion reinforced by one literature review citing a number of "variables for which nurse practitioners received higher scores than physicians." These variables include:

> . . . amount/depth of discussion regarding child health care, preventive health, and wellness; amount of advice, therapeutic listening, and support offered to patients; completeness of history, including the recording of previous problems and followup of problems and therapies; completeness of physical examinations and interviewing skills, and patient knowledge about the management plan given to them by the provider (187).

Table 2-2 also suggests that NPs are especially good at assisting ambulatory patients with chronic problems such as hypertension and obesity (189, 211). After clinic visits for chronic problems, NPs' patients are less likely than physicians' patients to report that their activities are limited or that they experience anxiety about their problems (139). Whether NPs' interpersonal skills contribute to their ability to care successfully for patients with chronic problems has not been determined. Physicians, however, appear to provide better care in managing problems that require technical solutions (104).

Patients' Satisfaction

Overall, patients are satisfied with the care they receive from NPs (25,41,80,82,139,141,145,207, 231,265). Moreover, patients appear to be more satisfied with the care they receive from NPs than with care from physicians, in regard to several factors: personal interest exhibited, reduction in the professional mystique of health-care delivery, amount of information conveyed, and cost of care (41,145,190).

A few studies, however, indicate patients' dissatisfaction with one or more aspects of NPs' care or show patient preference for physicians' care. Patients are concerned about long waits to see NPs (145),[5] about how well NPs communicate with pa-

---

[5] This finding was consistent across 10 settings, including solo practices, university student-health centers, public health-department clinics, private-hospital outpatient clinics, and a health maintenance organization.

Table 2-1.—Equivalence in Quality of Care Provided by Nurse Practitioners (NPs) and Physicians (MDs)

Activity or measure	Setting	Study type	Source
Process measures:			
Adequacy of pediatric physical assessment	Health center, low-income neighborhood	Retrospective chart review	Duncan, et al., 1971
Adequacy of prescribing medication	Two MD family practice	Randomized controlled trial	Spitzer, et al., 1974
Adequacy of the management of episodes of care	HMO	Prospective; chart review, timing of segments of patient visits	Spitzer, et al., 1974; Salkever, et al., 1982
Management of hypertensive patients	Rural primary care center	Retrospective chart review	Watkins and Wagner, 1982
Similarity of treatment plans for pediatric patients	Military outpatient clinic	Retrospective evaluation of NPs' and MDs' treatment plans	DiGirol and Parry, 1983
Short- and long-term compliance by patients	Emergency room	Prospective study with data collection at emergency room visit, short-term followup, and long-term followup	Powers, et al., 1984
Outcome measures:			
Patient's physical, emotional, and social functional status	Two MD family practice	Randomized controlled trial	Sackett, et al., 1974
Resolution of acute problems	Hospital ambulatory care clinics	Record review	Komaroff, et al., 1976
Resolution of acute problems	Prepaid group practice	Survey of providers and patients with telephone followup of patients at 1 week	Levine, et al., 1976
Reductions in pain or discomfort among pediatric patients	Prepaid group practice	Survey of providers and patients with telephone followup of patients at 1 week	Levine, et al., 1976

SOURCE: **Process measures:** M.T. DiGirol and W.H. Parry, "Consultation to the Pediatric Automated Military Outpatient Systems Specialist (AMOSIST): A Comparison of Consultation by a Pediatric Clinical Nurse Specialist and by a Pediatrician," *Military Med.* 148(4):364-367, April 1983; B. Duncan, A.N. Smith, and H.K. Silver, "Comparison of the Physical Assessment of Children by Pediatric Nurse Practitioners and Pediatricians," *Am. J. Public Health* 60(6):1170-1176, June 1971; M.J. Powers, A. Jalowiec, and P.A. Reichert, "Nurse Practitioner and Physician Care Compared for Nonsurgery Emergency Room Patients," *Nurse Practitioner* 9(2):39-52, February 1984; W.O. Spitzer, D.L. Sackett, J.C. Sibley, et al., "The Burlington Randomized Trial of the Nurse Practitioner," *N. Engl. J. Med.* 290(5):251-256, Jan. 31, 1974; L.O. Watkins and E.H. Wagner, "Nurse Practitioner and Physician Adherence to Standing Orders Criteria for Consultation or Referral," *Am. J. Public Health* 72(1):22-29, January 1982.
Outcome measures: D.M. Levine, L.L. Morlock, A.I. Mushlin, et al., "The Role of New Health Practitioners in a Prepaid Group Practice: Provider Differences in Process and Outcomes of Medical Care," *Med. Care* 14(4):326-347, April 1976; A.L. Komaroff, K. Sawyer, M. Flately, et al., "Nurse Practitioner Management of Common Respiratory and Genitourinary Infections, Using Protocols," *Nurs. Research* 25(2):84-89, March-April 1976; D.L. Sackett, "The Burlington Randomized Trial of the Nurse Practitioner: Health Outcomes of Patients," *Annals Int. Med.* 80(2):137-142, February 1974; D.S. Salkever, E.A. Skinner, D.M. Steinwachs, et al., "Episode-Based Efficiency Comparisons for Physicians and Nurse Practitioners," *Med. Care* 20(2):143-153, February 1982.

tients (139), and about whether NPs can care for what patients perceive to be serious medical problems (131). Patients are dissatisfied with NPs who do not consult with physicians about diagnostic and treatment decisions (80,198). Some of these findings, particularly those having to do with waiting time and communication, contradict those of other studies (41,71,104,178,195), suggesting that some aspects of NPs' care may require further research.

Additional research on patients' satisfaction would be especially timely now, when the Nation's supply of physicians is growing, and more physicians seem to be locating in small towns (36,39,68,174,264), where a relatively large proportion of NPs have been providing health services. Any factors that might contribute to patients' dissatisfaction with NPs' care are likely to limit the employment and use of NPs as the growing supply of physicians allows more consumers to choose between NPs and physicians.

Malpractice insurance premiums and the incidence of malpractice claims indicate that patients are satisfied with NP care. Although insurance premiums for NPs are increasing, successful malpractice suits against them remain extremely rare. Not surprisingly, most of the estimated $1.4 billion in malpractice claims paid in the United States in 1984 (62) resulted from suits against physicians, particularly physicians in the surgical subspecialties. Physicians, however, far outnumber other types of providers, generally deal with the most complex cases, and have more financial resources than other providers.

Table 2-2.—Difference in Quality of Care Provided by Nurse Practitioners (NPs) and Physicians (MDs)

Activity or measure	Relative quality of care by NPs and MDs	Setting	Study type	Source
Process measure:				
Number of diagnostic tests	NP > MD	Hospital outpatient clinic	Random assignment of patients, record review, time and motion studies, patient interviews	Flynn, 1974
Number of diagnostic tests	NP > MD	HMO	Prospective, chart review, timing of segments of patient visits	Salkever, et al., 1982
Thoroughness of documentation of diagnosis and treatment information	NP > MD	Preventive medicine department of a multispecialty clinic	Cross sectional: Patient survey and chart review	Brown, et al., 1979
Adequacy of a telephone management of common pediatric problems	NP > MD	University pediatric clinic	Programed calls from a trained person about selected pediatric problems; calls recorded and analyzed	Perrin and Goodman, 1978
Effectiveness of interpersonal management skills (interviewing, communicating)	NP > MD	University pediatric clinic	Programmed calls from a trained person about selected pediatric problems: calls recorded and content analyzed	Perrin and Goodman, 1978 Hastings, et al., 1980
Management of problems requiring technical solutions	NP < MD	Jail health service	Record review and audit	Hastings et al., 1980
Outcome measures:				
Rate of patient return to employment	NP > MD	University hospital medical clinic	Random patient assignment: interviews, chart reviews	Lewis, et al., 1969
Reduction in number of symptoms in patients	NP > MD	University hospital medical clinic	Random patient assignment: interviews, chart reviews	Lewis, et al., 1969
Level of patient awareness of provider orders	NP > MD	University hospital medical clinic	Random patient assignment: interviews, chart reviews	Flynn, 1974
Level of control of blood pressure in patients with hypertension	NP > MD	City hospital and health department clinics	Record review	Runyon, 1975; Ramsay, et al., 1982
Level of control of blood pressure in patients with hypertension	NP > MD	University hospital hypertension clinic	Prospective record review	Ramsay, et al., 1982
Level of activity limitation and anxiety in patients with chronic problems	NP < MD	Prepaid group practice	Survey of providers and patients with telephone followup of patients at 1 week	Levine, et al., 1976
Amount of reduction in pain or discomfort in adult patients	NP > MD	Prepaid group practice	Survey of providers and patients with telephone followup of patients at 1 week	Levine, et al., 1976
Amount of weight reduction in obese patients	NP > MD	University hospital hypertension clinic	Prospective record review	Ramsay, et al., 1982

SOURCE: **Process measures:** J.D. Brown, M.I. Brown, and F. Jones, "Evaluation of a Nurse Practitioner-Staffed Preventive Medicine Program in a Fee-for-Service Multispecialty Clinic," *Prev. Med.* 8(1):53-64, January 1979; B.C. Flynn, "The Effectiveness of Nurse Clinicians' Service Delivery," *Am. J. Public Health* 64(6):604-611, June 1974; G.E. Hastings, L. Vick, G. Lee, et al., "Nurse Practitioners in a Jailhouse Clinic," *Med. Care* 18(7):731-744, July 1980; E.C. Perrin and H.C. Goodman, "Telephone Management of Acute Pediatric Illnesses," *N. Engl. J. Med* 298(3)130-135, Jan. 19, 1978.
Outcome measures: B.C. Flynn, "The Effectiveness of Nurse Clinicians' Service Delivery," *Am. J. Public Health* 64(6):604-611, June 1974; D.M. Levine, L.L. Morlock, A.I. Mushlin, et al., "The Role of New Health Practitioners in a Prepaid Group Practice: Provider Differences in Process and Outcomes of Medical Care," *Med. Care* 14(4):326-347, April 1976; C.E. Lewis, B.A. Resnick, G. Schmidt, et al., "Activities, Events and Outcomes in Ambulatory Patient Care," *N. Engl. J. Med.* 280(12):645-649, Mar. 20, 1969; J.A. Ramsay, J.K. McKenzie, and D.G. Fish, "Physicians and Nurse Practitioners: Do They Provide Equivalent Health Care?" *Am. J. Public Health* 72(1):55-57, January 1982; J.W. Runyon, "The Memphis Chronic Disease Program: Comparisons in Outcome and the Nurse's Extended Roles," *J.A.M.A.* 231(3):264-270, Jan. 20, 1975; D.S. Salkever, E.A. Skinner, D.M. Steinwachs, et al., "Episode-Based Efficiency Comparisons for Physicians and Nurse Practitioners," *Med. Care* 20(2):143-153, February 1982.

Physicians' Acceptance

A variety of factors affect physicians' opinions of NPs. For example, physicians are more inclined to approve NPs' performance of relatively simple tasks, such as history-taking, than to approve NPs' performance of more challenging clinical tasks (84,108). Another major factor influencing physicians' opinions of NPs is personal contact. Physicians who work with NPs express more satisfaction with NPs' performance and more willingness to delegate higher level tasks than do physicians whose contact is indirect or nonexistent (21,134,223). This finding might indicate quality, but it might also reflect physicians' opinions about such non-quality-of-care factors as the relatively low cost of NP care or the freeing of time for physicians to see more patients or to spend in leisure.

Physicians in group practices and in institutional settings are more supportive of NPs than are solo practitioners. The level of physicians' satisfaction increases with the degree of their control over the activities of NPs (21).

Many physicians who approve of the concept of NPs have expressed only limited interest in actually employing them (134,223), although NPs and PAs were introduced and established in the United States largely because a minority of physicians chose to support, train, and hire them. About 65 percent of the NPs in the United States were employed as NPs in 1982, compared with 69 percent in 1974 (237).[6] No documented reason is available for the decrease in the employment rate, although some observers have attributed the slight downward trend to lack of acceptance by physicians, restrictive State licensing, and unfavorable reimbursement practices (135).[7] Furthermore, the validity of these statistics is questionable, because they are based on a very small number of NPs.

---

[6] More recent longitudinal, nationwide data on NP employment are not available.

[7] Many other factors may also contribute to the lower employment rate. The number of Master's programs preparing nurse practitioners has grown substantially (from 74 in 1977 to 124 in 1981), and the number of certificate programs has decreased (from 124 to 84 during the same period) (262). The decrease in employment may also partly reflect the increased number of NPs removing themselves from the work force and seeking doctoral degrees.

QUALITY OF PHYSICIAN ASSISTANTS' CARE

Comparisons With Physicians

Within the limits of their expertise, PAs provide care that is equivalent in quality to the care provided by physicians (73,92,129,230,242). What little evidence is available about how the quality of PAs' care differs from the quality of physicians' care indicates that PAs provide more counseling of obese patients than physicians provide (129), that PAs spend more time educating patients than physicians spend (159), and that PAs' patients generally are better able to resume their usual level of functioning than are patients of physicians (226).

Patients' Satisfaction

The few available studies that directly address patients' satisfaction indicate that patients generally are as highly satisfied with the care they receive from PAs as with the care received from NPs (127,173,179,207). One study found that patients' satisfaction is tempered by the desire to see PAs perform routine functions rather than make independent diagnostic and treatment decisions (227).

Photo credit: American Academy of Physician Assistants

The care provided by PAs functioning within their areas of training and expertise tends to be equivalent in quality to the care provided by physicians for comparable services.

Physicians' Acceptance

Physicians initiated and developed the concept of PAs and serve as instructors in PA training programs. PAs function as their name implies—as assistants to physicians. Thus, it is not surprising that many physicians accept PAs and are satisfied with their work (125,129,179,208).

Physicians' confidence in PAs extends beyond routine care. One recent study found that although physicians generally delegate routine, uncomplicated cases to PAs, physicians also permit PAs to treat walk-in patients with urgent problems if the physicians cannot treat those patients and honor previously scheduled appointments (57). Perry and Breitner (182) found that supervising physicians rate PAs higher than NPs on tasks involving educating, counseling, or instructing patients.

The high level of physicians' satisfaction with PAs may help account for their continued high employment rate. Employment rates provide the most consequential expression of physicians' acceptance, and nearly 86 percent of the Nation's PAs were employed as PAs in 1981 (45). By 1984, the employment rate had increased slightly to approximately 88 percent; only 8.4 percent had not been employed as PAs for more than a year (219).

QUALITY OF CERTIFIED NURSE-MIDWIVES' CARE

Comparisons With Physicians

CNMs can manage normal pregnancies safely and can manage them as well as, if not better than, physicians (65,148,190,193,226). Studies show that, in accordance with their training, CNMs recognize deviations from the norm and seek medical consultation promptly (65,210). The fact that CNMs provide standard care has been documented in a variety of settings, including hospital inpatient services, hospital clinics, migrant health centers, neighborhood health centers, and private practices (67).

As measured by such short-term indicators as Apgar scores (a numerical expression of the condition of a newborn infant) and birthweight, comparable outcomes of normal, low-risk pregnancies result from care by CNMs and care by physicians (65,196,226). CNMs' care and physicians' care also compare with regard to birth outcomes measured by fetal, perinatal, neonatal, and maternal mortality (65,181). A randomized clinical trial of uncomplicated deliveries showed no significant difference in the outcome of care whether provided by CNMs or by the obstetric house staff, except that CNMs kept more appointments and performed fewer forceps deliveries (226).

Data on birth outcomes reveal that proportionately fewer low-birth-weight infants result from deliveries managed by CNMs than from those managed by physicians (253). Although this might seem to indicate that CNMs provide better care than physicians, it might reflect CNMs' referral of high-risk pregnancies to physicians. In one recent study, the low-birth-weight rate for CNM-managed deliveries was 28 percent less than the control group's rate; the CNMs had also provided prenatal care, whereas the control group received prenatal care from State-supported maternal and child-care clinics (184).

CNMs appear to differ from obstetricians in some processes of care. CNMs order medications less frequently than do obstetricians (65), low-risk patients of CNMs have shorter inpatient stays for labor and delivery than do low-risk patients of obstetricians (65), more obstetrical patients of CNMs are tested for urinary tract infections and diabetes than are patients of house staff physicians (226), and CNMs communicate and interact more with their clients than do physicians (66,181,190, 265). The care given by CNMs differs from the usual care given by the physicians in the personal attention patients receive throughout labor and delivery. Most physicians' care is episodic, which may contribute to the fact that they rely more heavily than CNMs do on technology, such as fetal monitoring (265).

Although CNMs are trained to provide normal, low-risk maternity services, some of them collaborate with physicians to participate in the care of high-risk women during labor and delivery. These CNMs perform such tasks as:

> . . . applying internal uterine pressure monitoring devices or fetal scalp electrodes, obtaining fetal scalp blood samples, managing breech or multiple gestation deliveries, utilizing low or outlet forceps, or utilizing vacuum extractors (10).

Little evidence exists about CNMs' effectiveness in performing these tasks, although one researcher concluded that CNMs "can render safe, effective services to about one-third of the high-risk obstetric population" (210). Rooks and Fischman (203) found that most CNMs working in collaboration with physicians manage the care "of prenatal patients with some complications."

Patients' Satisfaction

Women served by CNMs are satisfied with the care they receive (65,181,190,209).[8] Although obstetric patients from all socioeconomic strata are satisfied with CNMs' care, favorable feelings toward CNMs increase with patients' age, educational background, and number of births (59). Patients' satisfaction has been recorded for a wide range of family planning services and normal maternity care provided by CNMs in a variety of ambulatory care and hospital settings (209). CNMs also appear to be readily accepted by new patients—90 percent of the patients seeking obstetric services from a group practice of obstetricians accepted services from a CNM the practice had recently employed (190).

When comparing their satisfaction with services provided by CNMs and obstetricians, patients of CNMs express preferences for the greater ease of communicating with CNMs and the chance CNMs allow them to exercise more control during delivery (209). Perry found that none of the patients whose babies had been delivered by CNMs would have preferred to have had them delivered by obstetricians, although some of the physicians' patients said that in retrospect they would rather have been cared for by CNMs (181). Patients in a large health maintenance organization expressed satisfaction with the care they received from both obstetricians and CNMs, but the CNMs' patients were significantly more likely to express great satisfaction with, and great confidence in, their providers (65). This study also found that patients of CNMs were more satisfied than those of physicians with the promptness with which they could obtain their first prenatal care visit and with the relatively short time they spent waiting in reception rooms (65).

CNMs differ markedly from obstetricians with respect to frequency of malpractice suits, a crude gauge of patients' acceptance. The number of CNMs who obtained malpractice insurance under the auspices of the American College of Nurse-Midwives (ACNM) grew from 625 in 1976 to 1,400 in 1983. Between 1977 and 1982, 20 claims (not all successful) were made against ACNM group policyholders (55). A 1982 national survey of CNMs found that 5.2 percent (55 of 1,065 respondents) had been named in malpractice suits during their careers (55). By contrast, of the 1,915 members of the American College of Obstetricians and Gynecologists responding to a recent survey, 31 percent said they had been sued once, 16 percent had been sued twice, and 20 percent had been sued at least three times (55). Interpreting these figures, however, is difficult, partly because they do not reflect case-mix differences. CNMs send patients with complicated or high-risk problems to physicians, especially in emergencies. That relatively more obstetricians than CNMs are sued may not reflect performance as much as the fact that obstetricians deliver many more babies than do CNMs and have higher incomes than CNMs.

Physicians' Acceptance

CNMs may practice administratively and physically apart from obstetricians and gynecologists, but by functioning "interdependently with" these physicians, the CNMs retain the formal support of the American College of Obstetricians and Gynecologists. The American College of Obstetricians and Gynecologists has agreed with the American College of Nurse-Midwives that:

---

[8] Perhaps the main problem with most studies of CNMs is the possible bias resulting from nonrandom assignment of patients to different types of providers. Self-selection suggests that those women who accept care from CNMs are inclined to be satisfied with CNMs' care (just as it suggests that those women who choose care from an obstetrician are inclined to be more satisfied with physicians' services). Nevertheless, studies consistently find patient acceptance of CNMs and some studies find that patients express relatively greater satisfaction with CNMs' care than with obstetrician's care.

> . . . the appropriate practice of the certified nurse-midwife includes the participation and involvement of the obstetrician/gynecologist as mutually agreed upon in written medical guideline/protocols (13).

The two colleges further agree that:

> Quality of care is enhanced by the interdependent practice of the obstetrician/gynecologist and the certified nurse-midwife working in a relationship of mutual respect, trust and professional responsibility. This does not necessarily imply the physical presence of the physician when care is being delivered by the certified nurse-midwife (13).

Nonetheless, CNMs have had difficulty in obtaining acceptance by practicing physicians, medical societies, hospital departments of obstetrics and pediatrics, companies that provide malpractice insurance, State boards of health, and—not infrequently—nurses, themselves (196). Obstetricians and gynecologists are thought to find competition from CNMs threatening to physicians' position as the sole providers of a special type of medical care (43,190). Opposition may also reflect the tightening market conditions facing obstetricians and gynecologists in urban areas (196). In addition, other physicians, particularly general and family practitioners, have resisted CNMs (258).

Despite the reservations of many physicians as to whether CNMs are needed, their employment rate has been increasing in recent years. In 1976 and 1977, only about half of the Nation's CNMs were employed in clinical midwifery practice (9), but by 1982, approximately two-thirds (67.2 percent) of the CNMs in the United States were employed in nurse-midwifery practice (10). The CNMs' employment settings may better reflect the extent of physicians' acceptance. Although the percentage of CNMs employed in private practice with physicians increased from 13 percent in 1976 and 1977 to 20 percent in 1982, most CNMs in 1982 were employed in organizational settings or in private nurse-midwifery practice (see table 2-3).

Table 2-3.—Percentage of U.S. Resident Certified Nurse-Midwives by Type of Organization, 1976-77 and 1982

Type of organization	1976-77	1982
Hospital	45.6%	35.8%
Private practice with physicians	12.9	19.8
Private nurse-midwifery practice	2.4	14.4
Public health agency	13.8	8.6
Maternity service operated predominantly by nurse-midwives	7.6	7.7
Branch of the U.S. military	8.2	6.2
Prepaid health plan	3.4	6.0
University health service	5.0	1.8

SOURCES: American College of Nurse-Midwives, *Nurse-Midwivery in the United States: 1976-77* (Washington, DC: 1978); and American College of Nurse-Midwives, *Nurse-Midwivery in the United States: 1982* (Washington, DC: 1984).

SUMMARY

Within their defined areas of competence, NPs, PAs, and CNMs generally provide care that is equivalent in quality to the care provided by physicians for similar problems. Considerable evidence exists, particularly for NPs and CNMs, that they are more adept than many physicians at communicating effectively with patients and managing patients who require long-term and continuous care. Such patients include chronically ill patients and patients undergoing labor and delivery. Although the evidence is less voluminous concerning PAs' supportive-care and health-promoting activities, data indicate they overlap with NPs' activities of that nature.

The findings for NPs and PAs apply primarily to care provided in ambulatory settings, and the activities of CNMs have been documented in a variety of settings with favorable results. Although the findings are qualified by the methodological limitations of the techniques used to indicate quality, the weight of the evidence seems to show that the health-care services provided by these practitioners are equivalent in quality to comparable services provided by physicians.

Although patients are generally very accepting of care provided by NPs, PAs, and CNMs, patients are most satisfied with the services that require interpersonal skills. Patients seem to require what might be called technical reassurance for serious conditions and to prefer that NPs, PAs, and CNMs consult with physicians when technical care is required.

Patients' satisfaction with NP, PA, and CNM care is affected by factors external to the actual care provided. Satisfying a particular patient depends partly on the physician's conveying to the patient a sense of approval of the NP, PA, or CNM (113). Patients' judgments may also reflect their past experiences with medical care and their socioeconomic status. One study, for example, found that an upper-middle-class population accustomed to receiving care from fee-for-service physicians evaluated providers mainly on the basis of technical competence (35). Patients' age, sex, and race also affect their opinions. Middle-aged people, males, and blacks are more accepting of NPs (80); whites are more accepting of CNMs than are blacks, who are more likely to associate the word midwife with untrained lay midwives (201). The American Nurses' Association (21) concluded that trust in NPs and PAs varies with the options available to patients, and that satisfaction with NPs and PAs tends to be highest when access to other sources of care, particularly physicians, is limited. Patients' satisfaction with CNMs, however, appears to be independent of access to other sources of obstetrical care (201).

Based on historical data, physicians accept the concept of NPs and PAs but remain concerned about their practicing independently. Physicians have been reluctant to accept CNMs, especially those practicing independently. Physicians' willingness to delegate tasks depends on the particular tasks. Most physicians who hire NPs, PAs, or CNMs are satisfied with their performance. Employment status, the most relevant indicator of whether physicians accept NPs, PAs, and CNMs, is satisfactory; PAs, in particular, apparently enjoy a high level of appreciation by physicians. Increasingly, CNMs' employment is independent of physicians. A growing supply of physicians and potentially heightened competition may decrease physicians' acceptance of these health practitioners. Indeed, the American Medical Association resolved in 1985 to "oppose new legislation extending medical practice to nonphysician providers" (136).

Chapter 3

Access to Care

Chapter 3

Access to Care

In the late 1960s and the 1970s, health policy focused on making health care accessible to all Americans; much effort went toward helping people enter the health care system (1). A particular concern was geographic access to primary care, because the geographic maldistribution of physicians and their patterns of specialization had left many of the Nation's inhabitants without adequate access to primary care.

Indeed, the creation and development of nurse practitioners (NPs) and physician assistants (PAs) occurred in large part in response to the limited accessibility of basic medical services, especially in rural and inner-city areas, where physicians were disinclined to practice (74,169,183).[1] The stated purpose of the early training programs for NPs was to improve access to primary care for people in areas without enough physicians (236). Similarly, PAs were intended to "help remedy the shortage of primary care physicians, particularly in medically underserved areas" (180). Much of the impetus for the growth in the number of certified nurse-midwives (CNMs) during the 1970s can be attributed to concern about the limited supply of obstetricians in the United States (180).

The various barriers to providing care must be considered in assessing the success of NPs and PAs in improving health care in medically underserved areas. Legislation and regulations vary widely from State to State but generally tie medical practice by NPs, PAs, and, to some extent, CNMs to associations with physicians and limit such practice where physicians are not present. Although NPs may provide nursing services independently, for the most part neither NPs nor PAs can provide medical services unless local physicians are willing to hire them. Medicare and Medicaid rules regarding payment also significantly impede NPs, PAs, and CNMs by restricting payment for medical services to the supervising physician or institution. The Rural Health Clinic Services Act (Public Law 95-210) waived the restriction for direct supervision of NPs, PAs, and CNMs practicing in certified rural health clinics located in designated underserved areas (see app. B).

Whether NPs, PAs, and CNMs are needed to improve access to primary medical care in underserved areas remains an issue, even though the supply of physicians has increased, and some physicians have moved away from urban areas (174, 264). Some experts believe that competitive pressures will eventually remedy the maldistribution of medical manpower (222) but, the proportions of physicians in urban and rural areas have remained fairly constant since 1970 (255).

Furthermore, large overall increases in physician supply in a State may still leave some areas in the State without adequate access to medical care (112). The situation may worsen in those areas as older physicians are not replaced by younger ones. Indeed, the Bureau of Health Professions has predicted that unmet needs for primary care will persist in many currently designated shortage areas. Although the dispersal of young primary-care physicians is expected to reduce overall shortages, reducing shortages in all underserved areas may take an extensive period of time (250).

Although the need remains for NPs, PAs, and CNMs to provide care to underserved populations and in underserved areas, interest has increasingly focused on these providers' abilities to deliver good medical care in certain institutional settings, such as jails, and to specific populations, such as elderly people and poor women and their infants. In addition, by functioning as case managers, these providers can help patients find appropriate care in our increasingly complex health-care system. (The effect of NPs, PAs, and CNMs on access to specific services, such as health education, counseling, and health promotion, is addressed more completely in chapter 2.)

---

[1] Other factors, including improved integration of nursing and medicine, bolstered the NP movement, which signified a deliberate move to expand the nursing role and to meet the health-care needs of many underserved populations. Other factors that contributed to the success of NPs, PAs, and CNMs are the consumers' and women's movements, the new focus on self-help and self-care, and other pushes for social and personal change that emerged during the late 1960s and continue today (229).

NURSE PRACTITIONERS' CONTRIBUTIONS TO ACCESS TO CARE

Although legal constraints (such as requirements for supervision by physicians[2]) have hindered NPs' dispersal to isolated settings, NPs have helped improve geographic access to primary care (31,86,160,168,261). In 1977, 23 percent of NPs worked in inner-city settings and 22 percent in rural areas (238)—the geographic areas of greatest need (120). In 1980, the proportion of NPs working in these settings had increased to 47.3 percent in inner cities but decreased to 9.4 percent in rural areas (255). In both inner cities and rural areas, more than half of NPs' patients had annual incomes of less than $10,000 (255).

NPs alone cannot entirely resolve the problem of provider maldistribution, because the professional, social, and cultural attractions of the suburbs and cities that appeal to many physicians also appeal to many NPs. An early survey of NPs in six States found that generally they "do not work in the inner city or in rural areas" (81), but a Pennsylvania NP-training program surveyed its graduates through 1982 and found that 70 of the 102 graduates worked in urban programs with low-income people (151).

NPs tend to view themselves as being able to function effectively and appropriately not only in settings with physicians, but also in practices without physicians on the premises. Starting in the mid-1960s a significant minority of NPs worked in satellite settings as the sole providers of services; they received medical supervision from physicians working in other communities. Often, the backup physicians would be available for telephone consultations, would visit the satellite settings, and would be responsible for ensuring that the NPs adhered to the protocols guiding the provision of medical services. These NPs increased access to care by working in places where physicians had not located.

NPs' extension role is no longer as significant as it was in the 1960s and 1970s. A national sample of 44 rural communities[3] identified in 1975 as having satellite practices (most of which were staffed by NPs; some by PAs) illustrates this decline. By 1979, only 24 of the centers were staffed by NPs or PAs alone (37). By 1984, 18 were staffed only by NPs or PAs, 8 were staffed only by physicians, and 6 were staffed by a combination of physicians and NPs or PAs. In all but 4 of the remaining 12 communities, where satellite clinics had ceased functioning, physicians' practices had been established (38).

More recently, NPs' contribution to access has been in nongeographic settings where not enough physicians have been available. Case studies report the satisfactory performance of NPs in a wide variety of settings. NPs act as team members in home health and nursing home care for elderly patients (220) and in correctional institutions (104), and in home health care for children with chronic illness (234). NPs also provide terminal care in patients' homes (268); ambulatory care in large municipal teaching hospital units (30); and primary care in inpatient units (224), in normal newborn nurseries (188), and in occupational health settings (26). NPs also deliver preventive care in the workplace (216), in retirement communities (109), and in industrial settings (47,162). These descriptive reports are only a beginning; larger scale studies are needed to evaluate the quality of care NPs provide in these settings.

Whether NPs can improve access to health care in schools has been carefully examined. A large-scale study, involving 18 school districts in 5 States, reports that NPs working as part of health-care teams in schools can have highly favorable effects on school children's health (197). NPs are especially valuable in improving access to primary care and supplementary care in rural areas and in health programs for the poor, minorities, and people without health insurance.

People over 65, a growing segment of the population, suffer serious gaps in their ability to obtain health care. Many physicians lack the expertise or time required for managing all aspects of elderly patients' health problems. Although private attending physicians provide most of the medical care in nursing homes, many physicians are unwilling to care for patients in nursing homes (166).

---

[2] Requirements for physicians' supervision of NPs vary from State to State. In many States, physicians must be on the premises but not necessarily in the same rooms as the NPs providing the services.

[3] The communities had populations of less than 10,000, with an average population of less than 2,000, and were at least ½ hour in travel time from communities that had populations of more than 10,000.

NPs are trained to care for the older population. Indeed, 40 of the approximately 200 NP-training programs focus on geriatrics, and 31 other NP programs have gerontological components (254). Furthermore, much of the care that institutionalized elderly people need is the kind that NPs can best give—health maintenance, personal assistance, chronic-disease management, recognition of acute or exacerbating chronic conditions, ongoing accurate and comprehensive health assessment, appropriate and expeditious referral to other team members, medication management and review, coordination of daily services, family and patient education and counseling, and so on. NPs have the assessment skills to recognize complicated acute illnesses or serious exacerbations of chronic diseases and to make medical referrals (157).

The few available studies show that NPs have the professional ability to assist with the care of institutionalized elderly patients (124,220,262). But of the more than 23,600 nursing homes in the United States, only approximately 250 have geriatric NPs on their staffs providing patient care (76). Interest in the effectiveness of NPs in nursing homes is growing rapidly, however, as evinced by the number and size of current studies of the issue.[4]

NPs improve access for the general population by acting as case managers, matching the needs of patients with appropriate services (88). NPs are effective in coordinating the care of many other health professionals, interservice transfers, and continuity of care, and in mobilizing family, institutional, and community resources (77).

NPs also are particularly effective in improving access to care for groups that, for a variety of reasons, have difficulty in obtaining the care they need. For example, NPs and PAs work well as members of multidisciplinary teams in improving access for chronically ill elderly people, whose needs for health services are great and whose abilities to manage the health-care system are limited (155). The NPs and PAs facilitate linkages between the community and the nursing home. NPs, working as members of teams with physicians, are also effective in educating couples about the nature of treatment for infertility and in providing emotional support to people seeking such treatment (175).

In general, NPs appear to improve continuity of care. In institutional settings, their patients miss fewer appointments than do physicians' patients (30). Studies have generally shown that patients of NPs in fee-for-service settings (34,84), as well as in clinics and health maintenance organizations (225), have higher rates of completed followup visits than do patients of physicians (213). These findings may explain the special success NPs have in caring for chronically ill patients and may reflect the adequacy (or inadequacy) of relationships between the practitioners providing care and the patients.

NPs affect access by expanding the scope of care for their patients into dimensions that physicians might ignore. For example, some studies show that NPs provide greater amounts of health education than do physicians. NPs are more likely than physicians to explain why medications are administered and what side effects are possible, and to discuss health-promoting behaviors with patients (34,84). Unfortunately, these studies do not say whether the need for health education is greater among the patients seen by NPs or among those seen by physicians.

NPs spend about 50 percent more time than physicians spend on each en ounter with a patient (143). The time an NP spends over the course of an illness, especially a chronic illness, may be less than that spent by a physician, however, because the NP has fewer encounters with the patient (143). The fact that NPs provide a more personal kind of care may account for the greater time they spend with patients. One study found that pediatric NPs are as efficient as physicians in gathering historical data and suggesting therapy, and attributed the NPs' greater time per encounter to greater communication with patients—gathering more information from patients and offering more advice to them (178). However, evidence from other studies is insufficient to support or refute this study's finding, and other factors may play a role. For example, the greater amount of time NPs spend with patients might be due in part to management. When NPs are used efficiently in practices, physicians might be able to spend less time with patients.

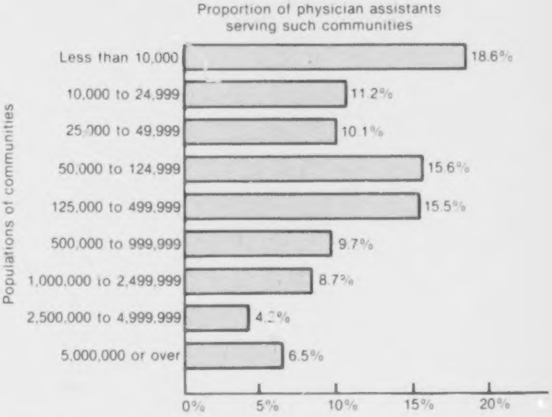
---

[4] Ongoing studies include a large-scale research project measuring how geriatric NPs employed in nursing homes affect the quality and costs of care. This project is being conducted by the Mountain States Health Corp., the Rand Corp., and the University of Minnesota School of Health Sciences and funded by the Health Care Financing Administration and the R.W. Johnson and the W.K. Kellogg Foundations. The faculties of the Geriatric Nursing Programs at the University of Arizona, the University of California at San Francisco, the Univerisity of Colorado, and the Univeristy of Washington are examining the role of the geriatric NP in concert with the study, and the Group Health Cooperative of Puget Sound has received funding from the Fred Meyer Charitable Trust to evaluate NPs employed by the health maintenance organization to serve elderly enrollees living in nursing homes—if a Medicare waiver of mandatory physician visits can be obtained (157). In addition, the Health Care Financing Administration has granted a waiver under Medicare and Medicaid to permit fee-for-service reimbursement for the provision of medical services to residents of nursing homes by physician-supervised NPs and PAs. A cost and utilization evaluation is being carried out by the Health Care Financing Administration's Policy Center at Rand.

PHYSICIAN ASSISTANTS' CONTRIBUTIONS TO ACCESS TO CARE

PAs have also contributed notably to improving geographic access to care. A number of studies have shown that they are more interested than physicians in locating in nonaffluent, medically underserved areas with high percentages of nonwhite populations (90,137,147,169). This willingness is reflected in statistics on where PAs practice in the United States. Whereas about 27 percent of the general population and 14 percent of the Nation's physicians are located outside standard metropolitan statistical areas (SMSAs), 32 percent of PAs practice outside SMSAs (49). And the percentage of PAs working in communities with populations of 10,000 or less has remained constant from 1974 to 1981 (45). The 1984 Masterfile Survey of Physician Assistants reports that 6.5 percent of PA respondents were located in rural areas of fewer than 10,000 people and that 40 percent were in communities of fewer than 50,000 people (6) (see figure 3-1).

Figure 3-1.—Distribution of Physician Assistants by Size of Community



Average community population = 980,235

SOURCE: American Academy of Physician Assistants, *1984 Physician Assistant Masterfile Survey* (Arlington, VA: 1984).

More NPs than PAs have staffed rural satellite health centers (38), perhaps because some NP-training programs recruited students from rural areas hoping they would return there as NPs. Nonetheless, in States that permit satellite clinics and permit PAs to practice apart from physicians, a significant minority of PAs work in such settings (45).

As members of health-care teams, PAs have improved access to care in settings where sufficient physician care is not always available. PAs are employed in industrial organizations; community clinics; drug and alcohol abuse clinics; nursing homes and extended-care facilities; and Federal, State, county, and city prisons (25).

Few physicians are trained in geriatric medicine (126), and the inadequacy of physician services for the growing population of institutionalized elderly patients is especially serious (122). Although more and better physician care for these patients may be available in the future (122), whether physicians can satisfy all the health-care needs of this group is questionable.

The potential of PAs in providing care for the elderly has been discussed in the literature (160, 215,218). Nearly 5 percent of PAs now provide care in nursing homes—the same proportion as in 1981 (6). The Federal Government has recognized this potential and requires an increased geriatric content in the curricula of federally funded PA-training programs. A survey of 34 federally funded programs' curricula, in fiscal year 1983, reported that three-fourths had varying degrees of geriatric content (254). Furthermore, the Federal Government (through the Administration on Aging of the Office of Human Development Services of the U.S. Department of Health and Human Services) partly supported the American Association of Physician Assistants in its report on the assessment and improvement of PAs' knowledge and skills in geriatrics (215). The report found a fivefold increase in the number of required and elective experiences in geriatrics among PA programs since 1980, which appear related to the Federal funding rules. However, the report noted the need for more uniform teaching of geriatric medicine in training programs. (The report includes guidelines for standardizing geriatric curricula during the training period and in continuing education programs for PAs.)

PAs have also expanded the scope of care that most patients receive. PA training programs require competence in interviewing, educating, and counseling patients (93). Although research is limited as to the interpersonal components of care that PAs provide, they appear to expand access to patient education and counseling by mixing competence in technical care with interpersonal skills (182).

CERTIFIED NURSE-MIDWIVES' CONTRIBUTIONS TO ACCESS TO CARE

Modern nurse-midwifery started in this country in 1925, when Mary Breckenridge established the Frontier Nursing Service to serve rural Kentucky. As of 1977, 10 percent of CNMs worked in communities with populations below 10,000 (9). CNMs still practice extensively in underserved areas, such as the rural South, Indian reservations, and inner cities, and significantly improve access to health care in those areas. For example, in Holmes County, Mississippi, the infant mortality rates dropped from approximately 38 per 1,000 live births to 20 per 1,000 live births 2 years after CNMs began providing primary care to pregnant women as part of a communitywide focus on the health problems of mothers and babies (158).

CNMs have also reduced financial barriers to access by providing care at relatively low cost, particularly in short-stay, out-of-hospital births. Many such births occur in birth centers not affiliated with hospitals. The number of these centers increased from 3 in 1975 to more than 100 in 1982 (33). They have made prenatal, labor and delivery, and postnatal services increasingly accessible to poor patients (65,149,193). For example, 15 birth centers are accessible to families in New York's Lower East Side, a low-income area (150). The relatively low cost of CNMs' services may result from shorter inpatient stays as well as lower fees (53,65). One study, however, found that CNMs' fees exceeded physicians' fees in urban locations (200), but nearly a year had elasped between the measurement of physicians' fees and the measurement of CNMs' fees, which may account for the finding. Also, a disproportionately large number of CNMs practice in academic medical centers, which have higher costs than community hospitals (200).

CNMs affect access (as well as quality) by providing person-oriented services, such as communicating thoroughly with patients, counseling, promoting self-help, and attending to patients' emotional needs (196). CNMs interact with patients more than physicians do (66,190,265). Patients feel more comfortable about asking questions of CNMs than of physicians (181,190). In addition, CNMs' patients obtain care relatively early in their pregnancies and continue to receive prenatal care relatively frequently (140,193,226). CNMs tend to increase the amount of prenatal care their patients receive.

In general, then, CNMs continue not only to lower financial barriers to care, but to offer a considerable amount of care that includes both health advisory and health-promotion services. This expertise is reflected in the valuable care CNMs on multidisciplinary teams provide for high-risk pregnant adolescents (184), especially in clinic settings (42). Indeed, the Institute of Medicine's report on preventing low birthweight calls for:

> . . . more reliance . . . on nurse-midwives . . . to increase access to prenatal care for hard-to-reach, often high risk, groups. This recommendation is based on the studies that indicate that CNMs can be particularly effective in managing the care of pregnant women who, because of social and economic factors are more likely to deliver low weight babies (121).

Photo credit: American College of Nurse-Midwives

CNMs are particularly effective in managing the care of pregnant women who are not at risk of having low-weight babies.

SUMMARY

NPs and PAs have long been recognized for increasing geographic access to primary health care, particularly for residents of inner cities and rural communities. Although indications are that physicians are migrating to smaller communities (174), the growing supply of physicians appears to be affecting different communities differently (250). Overall increases in the supply of physicians in a State may still leave some areas in need of primary care services (112). In those areas where access to physicians' services remains inadequate to serve the population or has decreased (112), NPs and PAs can continue to serve as a source of primary care. In areas where access to physicians' services has increased, employment opportunities for NPs and PAs might decrease. But the employment of NPs and PAs in rural areas has previously been limited by the scarcity of physicians willing both to practice in rural areas and to supervise NPs and PAs. Thus, the growing numbers of physicians in previously underserved areas may well increase employment opportunities for NPs and PAs. The physicians moving into smaller communities are mainly young physicians, who are more likely than older physicians to accept the team approach to health care and to use the services of NPs and PAs. Furthermore, a small town might be able to support a physician-NP or a physician-PA team but not two physicians. Whether these factors or others reduce the role NPs and PAs play in improving geographic access to care, these practitioners will continue to be valuable, especially in rural areas.

The evidence (primarily from case studies) is that NPs and PAs are improving access to primary health-care services in settings not adequately served by physicians. For example, NPs and PAs are trained to provide primary care for elderly patients in nursing homes, a growing population with poor access to standard health care. The effectiveness of NPs and PAs in this role is under scrutiny. They are also helping people to obtain primary care in an increasingly complex health-care system.

Studies have shown that NPs are especially valuable in providing primary care in school settings to previously unserved or underserved children, and in expanding the content of available care to include interpersonal and preventive care for all patients.

CNMs have not only made care more accessible in underserved areas, they have also contributed to making care financially available and have contributed to social and psychological access to care by the personal orientation of their services. Studies have shown that CNMs' communication skills and attention to the social and psychological needs of pregnant adolescents, as well as the technical care CNMs provide, have reduced the rate of low-birth-weight babies among this high-risk population.

Chapter 4

Productivity, Costs, and Employment

Chapter 4

Productivity, Costs, and Employment

Several studies have examined the scope of practice and productivity of nurse practitioners (NPs), physician assistants (PAs), and certified nurse-midwives (CNMs); how that scope relates to the tasks usually undertaken by physicians; and the implications of this evidence for the employment of these providers and for the costs of medical care.

Questions related to productivity include the nature and size of the contributions NPs, PAs, and CNMs make to medical practices' outputs (e.g., encounters between providers and patients). Questions related to costs include how much a practice must spend to employ an NP, PA, or CNM and how much society must spend to train these types of practitioners. Questions related to employment compare productivity with the costs of employment to ascertain whether medical practices could gain from employing more NPs, PAs, or CNMs, and whether society could gain from training more NPs, PAs, and CNMs. Because of the complexity of the issues involved and the lack of data, these questions are seldom addressed together. The literature does, however, permit the piecing together of some parts of this puzzle.

SCOPE OF PROFESSIONAL PRACTICE

Services Provided by Nurse Practitioners and Physician Assistants

The tasks NPs and PAs are trained to perform encompass a broad spectrum of primary care activities involving diagnosis and therapy (see ch. 1). Distinguishing between NPs and PAs on the basis of task descriptions is difficult. NP training may emphasize counseling and health promotion activities to a greater degree than PA training does, but the major difference lies in the practitioners' relationships with physicians. By definition, PAs work under physicians' supervision, whereas NPs have collaborative relationships with physicians and other health professionals.

Most observers conclude that most primary care traditionally provided by physicians can be delivered by NPs and PAs. Hausner and others (105) conclude that 60 to 80 percent of the tasks normally performed by primary care physicians can be provided by NPs and PAs without consultation. Record and others (192) estimated that 90 percent of pediatric care can be provided by NPs and PAs, and that NPs and PAs can substitute for physicians in providing 50 to 75 percent of all primary care services. Hausner and others (105) argue that NPs and PAs can safely perform enough of the primary care responsibilities to be considered viable alternatives in providing primary care, even where direct supervision is unavailable.

Photo credit: American Nurses Association

NPs are trained to perform a broad spectrum of primary-care activities.

What NPs and PAs are trained to do and what they do in practice may be different. Their actual roles depend on the settings in which they work. Limited information exists as to how practicing

NPs and PAs actually spend their time. A 1979 review cites four reports indicating that "nurse practitioners, in particular, emphasize preventive services," including one report concluding that NPs can provide as much as 75 percent of the well-person care for both adults and children (218). Other studies have found that NPs engage more often than physicians in providing interpersonal care (221) and chronic care (32). However, beyond these sorts of indications and references to the NP orientation to health education, counseling, and preventive and chronic care, accurate descriptions of the actual specific tasks performed by NPs do not exist. Indeed, such information would be difficult to obtain, because the range of primary care services provided by NPs in outpatient settings is so broad.

Little information exists concerning trends in the freedom of NPs to function independently of physicians. Nearly two-thirds of the pediatric NPs responding to a national survey in 1978 said that a physician was always physically present when they worked. Only 39 percent of the respondents to a similar survey in 1983 noted that a physician was always present (44). These findings suggest some movement toward administrative independence, but more data on other types of NPs working in a variety of settings are required in order to establish whether the trend is significant.

Although PA training programs also include health education and counseling, relatively little empirical evidence exists on how much health-promotion and disease-prevention services PAs actually provide. In general, PAs tend to focus more than NPs on providing acute care services (138). PAs place less emphasis on preventive services (218) and "provide selective patient services," whereas NPs are oriented more "toward treatment of the 'whole patient' " (160). These generalized characterizations do not apply universally, but they illustrate an important distinction between PAs and NPs: PAs tend to function primarily as substitutes for physicians, generally providing only services that physicians provide, whereas NPs are likely to provide both services usually provided by physicians as well as services generally provided by nurses.

Services Provided by Certified Nurse-Midwives

In 1982, the American College of Nurse-Midwives (ACNM) (10) conducted a survey of its members which obtained detailed information about the specific tasks performed by CNMs in clinical practice. Of the approximately 1,000 CNMs responding, over 75 percent delivered prenatal, labor, delivery, and postpartum care as well as family planning and normal gynecological services. The CNMs' responses to detailed questions about tasks showed that they provide the full range of services within their areas of expertise and they assume specific responsibility for many of the tasks which they perform without physician direction and supervision. CNMs clearly can substitute for physicians in performing a significant share of the tasks normally carried out by physicians. A major difference between CNM care and physician care is that CNMs are less likely than physicians to prescribe drug treatments, which may reflect both philosophical differences and legal restrictions. CNMs also tend to use less high-priced technology than physicians, and CNMs do not perform major surgery. In collaboration with physicians, however, CNMs manage high-risk patients during the prenatal, labor, and delivery stages.

PRODUCTIVITY

If the tasks performed by NPs, PAs, and CNMs overlap substantially with those performed by physicians, an obvious potential exists for these providers to substitute for physicians in the sense of performing tasks typically and characteristically carried out only by physicians. NPs, PAs, and CNMs can also complement physician care by providing some services, such as counseling or health education, not currently provided by many physicians or not carried out to the same extent.

Whether a service is a substitute or a complementary service is often difficult to determine.

Technically, empirical measurement of substitutability is complicated by the need for large amounts of accurate data on the prices and utilization levels of resources used in the production process as well as on the output of the production process. Therefore, studies of the role of NPs, PAs, and CNMs have taken the more straightforward approach of productivity analyses based on small samples, case studies, or simulations.

Productivity, simply stated, is output per unit of input. The productivity of medical practitioners is frequently expressed in terms of the number of patients seen per week or per hour of the practitioners' time. In comparing physicians with NPs, PAs, and CNMs, the appropriate method of measuring productivity depends on whether the NPs, PAs, or CNMs are working under direct supervision by physicians or working interdependently with physicians. For example, studies of PAs directly supervised by physicians examine how employing PAs marginally affects total practice output (e.g., the additional number of patients seen per week). Or time-and-motion studies of the production process might examine the tasks performed by PAs and how long they take, as compared with the time physicians would take. To evaluate the productivity of practitioners working in collaboration with physicians, as CNMs work, studies could compare the number of patients seen per week in collaborative practice with the number of patients seen for the same service by an obstetrician. Physicians could also be compared with NPs, PAs, or CNMs with regard to the number of minutes required per encounter for a particular type of patient or medical service. This approach attempts to control for case mix.

Comparing the productivity of physicians and PAs is facilitated by the fact that the tasks they perform overlap significantly. Indeed, PAs tend to provide essentially the same services physicians perform. The need to understand differences in content of care, therefore, is not as great in comparing physicians with PAs as in comparing physicians with NPs, who generally provide a much wider range of services.

Nurse Practitioners' and Physician Assistants' Productivity

Studies of NPs' and PAs' productivity have generally taken one of three approaches:

1. time per visit (comparing how much time physicians and NPs or PAs take to complete office visits);
2. average number of visits per unit of time (comparing how many visits different types of providers handle in a given period of time); and
3. marginal product (assessing the effect of adding an NP or PA on a practice's total number of patient visits).

Most studies of NPs and PAs indicate that these providers spend more time per office visit than do physicians (242). For example, Mendenhall and others (160) found in a national survey of physician practices that NPs averaged 19.4 minutes per direct encounter with a patient, PAs averaged 13.3 minutes per encounter, and physicians spent slightly more than 11 minutes per encounter. A study by Charney and Kitzman (52) yielded similar results, but studies are not unanimous on this issue. In a large health maintenance organization (HMO) —a special setting—Record and others (191) reported that PAs spent less time per routine visit (an average of 7.1 minutes) than physicians did (8.9 minutes). The study noted, however, that:

> . . . a sampling of medical charts revealed that even where the presenting morbidity was the same, physicians tended to get somewhat older patients with a greater number of associated morbidities, including chronic diseases, which might easily explain the time difference.

Also, Kane and others (129) found little difference in the amount of time physicians and physician assistants spent per visit. These data support the conclusion reached by Record and her colleagues (192) in a review of more than a decade of experience and studies, that "there is more of a tendency for NPs than for PAs to vary from physicians in the average amount of time spent on an office visit."

The shorter average time physicians, as compared with NPs and PAs, spend with patients translate into greater productivity over time. In other words, the number of encounters with patients per hour or per work week is higher for physicians than for NPs or PAs. Mendenhall and others (160) reported the following:

- NPs average 7.9 direct encounters and 2.4 telephone encounters with patients per day;
- PAs average 14.2 direct encounters and 2.6 telephone encounters with patients per day;
- physicians who supervise NPs or PAs average 18.9 direct encounters and 3.4 telephone encounters with patients per day; and
- physicians who do not supervise NPs or PAs average 21.4 direct encounters and 5.7 telephone encounters with patients per day.

Data from a recently completed national survey of rural health care delivery organizations indicated that primary care physicians saw an average of 105.6 patients per week and worked 48.6 hours per week, whereas NPs and PAs saw an average of 75.0 patients per week and worked 40.7 hours per week (107). On the average, then, these physicians, saw 2.2 patients per hour, compared with 1.8 patients per hour for NPs and PAs. Romm and others (199) found that, compared with PAs, NPs spent more time per patient and, therefore, saw fewer patients per week. Because physicians work more hours per week than do PAs and NPs, these productivity comparisons are best made on a per-hour basis, i.e., adjusting for the number of hours worked per week. Overall, the findings indicate that, in terms of patients seen per unit of time, NPs are less productive than PAs, who, are less productive than physicians. However, this result does not adjust well for severity of illness (i.e., case mix), nor does it necessarily mean that physicians are relatively cost-effective. For example, physicians might be three times more productive than NPs and PAs are, but cost six times as much as they do.

The extent to which hiring an NP or PA increases the output of a practice has been the subject of some debate (110,111,153). LeRoy (138) reported increases of between 20 and 90 percent in the productivity of physicians' practices that added NPs. Hershey and Kropp (110) used a model to estimate that the productivity gain may be only 20 percent after calculating the "offsetting changes in measures such as provider time available for nondirect patient care activities, patients' waiting time, waiting room congestion, practice hours, and supervisory requirements." The findings of Mendenhall and others (160) indicate that even though direct encounters between patients and the supervising physician decline when an NP or PA is hired, the practice's total output increases. Record and others (192) reported "greatly varying results" in studies of how adding an NP or a PA to a practice affected its productivity. Some studies found NPs and PAs to have greatly increased productivity, and other studies found that adding PAs or NPs actually decreased the number of patients seen. The one fact about which researchers appear to agree is that the potential for increasing productivity is greater in large practices than in small ones (111,192).

Three major problems arise in assessing productivity in terms of length of encounter or number of patients seen per unit of time. First, these units of measure do not reflect the content of the care provided or the severity of the patients' illnesses. Because some visits require more skill than other visits Holmes and others (114) applied a relative-value measure of productivity, considering both the number of visits and the complexity of those visits. The researchers found that although physician-NP teams handled only 5.7 patient visits more than physician-nurse teams handled each day, the teams with NPs were 26 percent more productive in terms of total value-weighted services (114). The difference in content of care is an important consideration because NPs provide more time-consuming services, such as health education and counseling, than do physicians and physicians are capable of providing some medical services that NPs cannot provide. Measures unadjusted for content and complexity of work may yield biased estimates of relative productivity.

The second major problem in basing productivity estimates on numbers of patients or lengths of visits is that these measures inadequately reflect the ultimate objective of medical care. The purpose of medical care is to treat and prevent health problems rather than to provide individual services. Recognizing this fact, Salkever and others (213) examined the productivity of physicians and NPs in terms of episodes of care, because episode-based assessments account for differences in referral, and because "the episode is also a more appropriate unit for measuring differences in effectiveness of care, since the outcome of the care process may be causally related not only to a service received at a single visit, but to any services received over the course of the episode." The researchers found that the per-episode costs were about 20 percent lower when NPs were the initial providers than when physicians were the initial providers.

A third major problem in ascertaining productivity is that existing studies reflect current substitution practices, which may not fully exploit the potential for using NPs and PAs cost-effectively. The fact that NPs and PAs can safely perform numerous medical-care services suggests that these practitioners have the capacity to be highly productive as individuals and to contribute substantially to the productivity of the organizations in which they work. But a key factor affecting the productivity of NPs and PAs is the extent to which their employers—often physicians—are willing to delegate tasks to them.

The evidence about what physicians actually delegate as opposed to what they can safely delegate is limited. A recent study of physicians in a large HMO (125) found that physicians did not delegate as many tasks as they thought NPs and PAs could handle safely. General internists, pediatricians, and obstetrician/gynecologists indicated that 49, 46, and 29 percent, respectively, of their total office visits could be shifted safely to PAs and NPs. The internists and pediatricians, however, were willing to shift only about 28.5 percent of their visits to NPs and PAs, and obstetrician/gynecologists were willing to shift only about 14 percent of their visits. Most pediatricians and obstetrician/gynecologists cited their patients' preferences for being treated by physicians and the physicians' own needs to maintain overall proficiency by seeing a full range of patients as the primary reasons for not delegating more. The primary reasons most internists cited for not delegating more were that seeing only complex cases would be too demanding and that patients preferred to receive care from physicians (125).

In addition to reflecting physicians' willingness or unwillingness to delegate responsibilities, the productivity of NPs and PAs depends on many factors, including practice type (solo or group), practice setting and size, case mix, how long the NPs or PAs have been practicing, practice regulations, and how much autonomy the NPs or PAs have. Many of these factors are beyond the control of NPs and PAs, however, which means that the potential or capacity of NPs and PAs has a limited effect on their productivity and, consequently, on their ability to affect the cost of care. Indeed, most productivity analyses consider NPs and PAs as part of physicians' practices. Little evidence exists as to the productivity and cost-effectiveness of NPs and PAs as autonomous practitioners.

In sum, the studies of the productivity of NPs and PAs suggest that:

- physicians can substantially increase their practices' output by employing NPs or PAs who operate under the supervision of physicians;
- although PAs, and, especially, NPs see fewer patients per hour than physicians see, these practitioners are capable of carrying substantial proportions of the workloads of primary-care physicians; and
- practice setting may be an important factor in NPs' and PAs' productivity, as evidenced by the differences in the use and productivity of NPs and PAs in HMOs and traditional settings.

The potential suggested by these studies is limited by the reluctance of physicians to delegate tasks. Evidence shows that physicians are reluctant to use NPs or PAs even to the extent that physicians think feasible and safe, basing their reluctance on patient preferences.

Certified Nurse-Midwives' Productivity

Compared to the many studies of NPs and PAs, much less information is available on the productivity on CNMs. Furthermore, "it is characteristic of the nurse-midwifery studies that they concentrate on outcome" (67). This almost exclusive focus on outcome rather than process limits information about CNMs' involvement in producing services.

One study (253) indicated that CNMs were only "about 23 percent as productive as obstetricians when the number of deliveries was used as the output measure." But the same study reported when the volume of patient visits was used as the output measure, CNMs were 98 percent as productive as obstetricians.

As with NPs, the content of care provided by CNMs must be understood because they stress the interpersonal aspects of care, such as counseling, health education, and patient interaction (103, 184). Such an understanding is necessary in order to specify what facet of the care provided by CNMs contributes to the positive outcomes their patients experience (226).

Data from the ACNM survey (1984) suggest substantial possibilities for CNMs to substitute for physician care. Many CNMs are already assuming responsibility for a wide variety of complex tasks in prenatal, labor, delivery, and postpartum care.

COSTS AND EMPLOYMENT

Although considerable scope exists for substituting of NPs, PAs, and CNMs in providing some of the care traditionally provided by physicians, the resulting increases in productivity are not enough, by themselves, to justify greater employment of these practitioners in private practices. From the standpoint of a private firm, the marginal value (as measured by the amount patients would pay for the additional output) must compare favorably with the marginal cost (i.e., the salary and related expenses) of hiring an NP, PA, or CNM. From the perspective of a long-run investment in training, either by society or by the trainees, the value (i.e., compensation) placed on the output of the NPs, PAs, or CNMs must compare favorably with the costs of training to justify expending the resources.

In 1983, annual salaries for NPs, PAs, and CNMs averaged about $25,000, compared with the $60,000 to $80,000 median salaries of primary-care physicians (18). This wage gap raises several questions. What are the costs and benefits to society of using NPs, PAs, and CNMs rather than physicians? And if NPs, PAs, and CNMs are cost-effective substitutes, why isn't their employment increasing relative to the employment of physicians?

NPs, PAs, and CNMs, clearly could not completely replace physicians, because the scope of the NPs', PAs', and CNMs' professional activities is constrained by their more limited training, reimbursement policies, legal barriers, and practice setting characteristics. Furthermore, NPs, PAs, and CNMs sometimes compete with professionals other than physicians or operate independent practices. Nonetheless, given the large overlap of their practices, primary care physicians provide an appropriate comparison group for considering the employment of NPs, PAs, and CNMs. Although some information is available about salaries, the figures are imprecise enough that the discussion must be carried out in approximate and qualitative terms.

Costs and Benefits of Training Nurse Practitioners, Physician Assistants, and Certified Nurse-Midwives

Estimates of the social and private rates of return to investments in training and education indicate the value placed on these investments by society and private individuals, respectively. The best of such computations require large amounts of data on earnings over the career of the individual. However, some conceptual issues can be addressed qualitatively. In theory, the rate of return on investment in the training of NPs, PAs, or CNMs can be calculated without reference to the training or earnings of physicians. Society must expend a certain amount to train a person to be an NP, for example, and this investment yields a return of about $25,000 per year (plus fringe benefits) minus what the person would have earned otherwise.

An alternative approach would be to consider the costs and benefits of training someone to be an NP, PA, or CNM instead of training the person to be a physician. The costs to society of training an NP, PA, or CNM are much less than the costs of training a physician. The direct costs related to education such as payments for instructors, supplies, and facilities, are greater for physicians than for NPs, PAs, and CNMs, probably on a yearly as well as overall basis. The indirect costs, primarily what the individual would have earned during the time spent in training, are also greater for physicians, because more years of schooling are required.

Differences between the social and private rates of return primarily reflect differences in the costs of education. The more that government subsidizes training, the higher will be the private rate of return, compared with the social rate. Little evidence exists as to what either rate of return is or what the differential between the two is, but educational subsidies over the years have been considerable. Scheffler (217) provides an estimate of the private rate of return as of the early 1970s, arguing that ". . . the private rate of return is sufficient to produce a relatively strong demand for PA training; therefore, an increase in government support is unwarranted." He finds high rates of return—over 20 percent—comparable to those received by physicians. The available data are probably insufficient to allow distinctions between these two types of investment, but thinking about them qualitatively is useful.

Nurse Practitioners and Physician Assistants

The most recent estimates of the costs of educating physicians and NPs, PAs, and CNMs were made in 1979 by the Congressional Budget Office (CBO). CBO estimated the mean total costs of educating NPs and physicians at that time to be $10,300 and $60,700, respectively. Assuming, conservatively, that these costs increased at an average annual rate of 6 percent, the total educational costs would have been $14,600 for NPs and $86,100 for physicians as of 1985.

A substantial portion of these direct costs are borne by taxpayers, rather than by the trainees. Society, through government support, has invested heavily in the training of NPs as well as physicians. For example, between 1975 and 1982, the Federal Government spent $65.9 million on educating NPs. These funds supported approximately half the NP training programs in the United States (251).

The indirect costs—primarily foregone earnings—are substantial, but they are difficult to estimate with any precision. Because a physician spends about 6 more years in training than does an NP, the indirect costs an individual must pay to become a physician are much greater. Determining the value of the foregone earnings for those individuals who become doctors versus those who become NPs is a more complex empirical task. Clearly, however, several NPs could be trained for the cost of educating one physician.

Extrapolating from CBO's estimates of PA-training costs (242), the total direct costs of training a physician assistant would have been $16,900, compared with $86,100 for training a physician as of 1985. The indirect costs for PAs are about the same as for NPs. Thus, the total costs of training are higher for PAs than for NPs, but the average earnings of PAs are higher than those of NPs ($24,500 versus $23,500) (44,237). Although, a more precise comparison would require some adjustment for the sex compositions of the two groups, the chief implication of the studies is that PAs, like NPs, are much less costly to train than physicians.

Certified Nurse-Midwives

The tuition charges for nurse-midwifery education vary considerably among programs, but an estimated average of the annual cost of educating a nurse-midwifery student is approximately $12,000 (78). The total cost of training is increasing with the growing trend toward master's degree programs, which last 2 years and are usually twice as long as certificate programs. Approximately 40 percent of the Nation's CNMs have graduated from master's degree programs. The average total training cost for certificate and master's programs combined is about $16,800, compared to the $86,100 cost of physician training as of 1985.

Costs and Benefits of Private Employment of NPs, PAs, and CNMs

Because physicians or group practices sometimes must choose between hiring additional physicians and hiring NPs, PAs, or CNMs, the perspective of the physician as employer should be considered in any attempt to understand the employment levels of these nonphysicians. Using NPs, PAs, and CNMs to provide services that would otherwise be provided by physicians can benefit society with lower fees if the cost of providing services by the nonphysicians is less than that of providing services by physicians and if the savings are passed on to patients. The costs of employing an NP, PA, or CNM include salary, fringe benefits, supervisory expenses, costs of any expansion necessitated by adding another provider to the staff and costs of resources used by the additional provider. These costs must be compared with the costs that would be incurred if a physician were added to the practice. The benefits a practice receives by hiring an additional provider are the additional fees the provider's services generate for the practice.

Nurse Practitioners

How employing a nurse practitioner would affect the cost of a practice cannot be determined with any precision, but the following simple calculation provides a rough picture of the effect. The median salary of NPs in clinical practice in 1983 was approximately $23,500. If fringe benefits averaged 25 percent of salaries, total costs would be about $29.500 per year. This is far below the $82,000 net income of young physicians (19). Hiring a nurse practitioner or another physician might also result in indirect costs for such things as new office space, new equipment, additional support staff, and additional resources.

Total practice costs would change in composition because physicians would spend some time supervising the NP instead of providing visits, or the NP might order more or fewer lab tests than the physician would have. However, the basic question is whether the total value of the practice output increases enough (i.e., would there be enough additional revenue) to cover the additional cost of the NP?

Denton and others (61) examined the effect of the additional costs in a hypothetical calculation of the savings that would have resulted in Canada in 1980 "had nurse practitioner time been substituted for physician time in the provision of all services for which such substitution has been demonstrated to be safe and feasible." The researchers concluded that the savings from this widespread use of NPs would have been from 10 to 15 percent for all medical costs (or from $300 million to $450 million) and that the savings would have amounted to between 16 and 24 percent of the total costs for ambulatory care. Furthermore, the researchers determined that their "estimates are quite insensitive to demographic changes and will be as valid in the future as they are today."

These findings are supported somewhat by the findings of Salkever and others (213), who compared patterns of treatment for otitis media and sore throat by three types of prepaid group practices—NP only, NP-physician team, and physician only. With respect to otitis media, the findings support the contention that NPs' services are less expensive than those of physicians. Services provided by NPs alone are less costly than those provided by physicians alone or by NP-physician teams. The researchers found no difference, however, between the cost of treatments for otitis media by physicians alone and NP-physician teams. The findings were similar for care of sore throats. These results confirm earlier studies (81,141) comparing the costs of specific medical tasks conducted by nurse practitioners with the costs of the same tasks conducted by physicians.

Physician Assistants

The average salary of a PA is $24,500 and fringe benefits probably amount to about 25 percent of their salaries, making the average direct cost of employing a PA approximately $30,600 per year a sum much lower than the average income of young primary-care physicians.

Accurately estimating the relative cost of employing a PA versus that of employing a physician requires an examination of the indirect costs that result from the resources expended by the additional employees. Little information exists about the extent of the costs PAs generate by using a practice's resources. For example, Wright and others (266) found that PAs generate more laboratory costs than medical residents but fewer than medical faculty. The calculations that Denton and others (61) employed for determining that using NPs would save 10 to 15 percent of the total cost for medical care in Canada could apply to using PAs, as well, because the researchers used the term *nurse practitioner* in a broad sense to encompass "several different types of intermediate health professionals."

Certified Nurse-Midwives

The average salary of CNMs was $24,800 in 1983. If their fringe benefits were 25 percent of their salaries, the average direct cost of employing a CNM was approximately $31,000 that year. The mean net income of obstetricians in 1983 was $119,900 (before fringe benefits) but because most CNMs have been practicing fewer than 15 years, the most appropriate figure for comparison would be the average salary of young—rather than all—obstetricians. The average income of young obstetrician/gynecologists is $100,000 per year plus $25,000 or more for fringe benefits.

As with the other types of health-care providers, the indirect costs a CNM generates by using a practice's resources need to be calculated to determine the full costs of employment. Evidence exists that clients of CNMs have shorter hospital stays than do clients of obstetricians (53,65). But Dickstein (53) found that clinic prenatal and postpartum costs in a large HMO were higher for CNMs than for obstetricians, "primarily because midwifery visits are longer and more frequent, use more RN educational time, and include the cost of OB consultations and referrals." Generally, although existing data do not allow precise quantification of the costs of CNM care and physician care, the salary differential probably ensures that the total costs are considerably less for CNMs than for physicians.

Costs Versus Benefits of Private Employment

The private physician's firm that employs an NP, PA, or CNM incurs extra costs for salary, fringe benefits, capital improvements, and other items. Productivity studies have shown that the time a physician spends supervising the NP, PA, or CNM reduces the number of patients the physician sees, although the reduction is more than offset by the overall increases in practice volume generated by the additional provider. Studies have not, however, directly addressed whether the value of the additional output exceeds the additional cost. In terms of rough magnitudes, the comparison is between a $25,000 salary (plus other costs) and a 20- to 50-percent increase in the practice's revenues, from a base of $150,000 to $200,000 annually. In view of the uncertainty about the extent to which an NP, PA, or CNM would increase marginal revenues, the marginal revenues do not clearly exceed the marginal costs. But the careful accounting by Denton and others (61) in Canada suggests that significant savings are possible for private practices that hire an NP, PA, or CNM rather than an additional physician.

CURRENT EMPLOYMENT: SETTINGS AND TRENDS

The productivity studies suggest that hiring NPs, PAs, and CNMs may provide private practices a cost-effective alternative to hiring additional physicians. And although private markets may be functioning as expected under existing legal and market institutions, unexploited social benefits may be available from the greater employment of NPs, PAs, and CNMs.

Nurse Practitioners' and Physician Assistants' Employment

Most of the pertinent studies have addressed the employment of NPs and PAs in primary-care settings, although NPs and PAs work at all levels of health care in a wide variety of settings (154). A 1982 national survey of pediatric NPs, for example, revealed that 22 percent of the respondents worked in hospitals, 20 percent in community-health agencies, 17 percent in private pediatricians' offices, 10 percent in specialty clinics, 8 percent in schools, 6 percent in HMOs, and the rest mainly in nursing schools and military clinics (167).

NPs are increasingly being employed in home health agencies (155,196,220,268), and finding work in nursing homes (87,262). NPs are also working in industrial settings (216), correctional institutions (104), and schools (156,228).

Different types of practice settings have different implications for any economic analysis of the benefits of hiring NPs or PAs. For example, comparing NPs with other nurses might be more appropriate than comparing NPs with physicians in such settings as home health agencies, HMOs, schools, and businesses, where NPs might be employed instead of, or in addition to, registered or licensed nurses. In these settings, the NPs—the more costly alternative—might be selected because they could provide a wider range of services. NPs employed in schools, for example, can serve as liaisons among the various health-care providers serving schools; NPs can also provide backup support and in-house education to school nurses and provide educational services to teachers, parents, and students (228).

Because of increases in the variety of settings in which NPs work, their employment rates might reasonably be expected to be higher than ever. But, proportionately fewer NPs are working as nurse practitioners in the 1980s than were doing so in the 1970s (237). The extent to which this decrease reflects increased competition from the growing supply of physicians is unknown.

PAs also work in a wide variety of settings and in every level of health care from primary to tertiary. Of all the Nation's PAs, about one-third work in office-based practices (about half of these PAs work with physicians in solo practices); another one-third or so are based in hospitals; and the remaining one-third work in prepaid groups, public health departments, drug and alcohol rehabilitation centers, industrial settings, nursing homes, prisons and jails, and military facilities (45). Considerable change has occurred in the proportion of PAs employed in various settings. For example, the proportion of PAs employed in hospitals grew from about 10 percent in 1974 to more than 30 percent today.

Increasing numbers of NPs, as well as PAs, are finding work in hospitals. This development may not be due to the implementation of prospective payment for hospitals based on diagnosis-related groups (DRGs) and, in fact, may be occurring despite DRGs. Instead, the trend is probably related in part to the growth in the supply of physicians.

> As the number of physicians increases in certain specialties, e.g., surgery, residency positions are being decreased to contain the numbers and PAs [are being] employed as 'junior house staff' to supplement patient care (262).

New employment opportunities for NPs and PAs may also stem from the trend for hospitals to establish community-based, ambulatory-care centers in order to broaden their patient bases and to assure themselves of solid sources of inpatient referrals. Hospital managers recognize that their best interests are served by providing these services as efficiently as possible and, consequently, by employing NPs and PAs.

Certified Nurse-Midwives' Employment

According to the 1982 ACNM survey, 36 percent of the Nation's CNMs worked in hospitals, 20 percent were in private practice with one or more physicians, 14 percent were in private nurse-midwifery practice, and the remainder worked in public-health agencies, prepaid groups, and other settings (10). Nearly 35 percent of the respondents to this survey revealed that they were not working as nurse-midwives, and about half of these said the reason was that "no nurse-midwifery positions are available in my community."

The data in table 2-3 indicate the changes that have taken place in how CNMs are distributed among the types of organizations in which they work. In general, the shift has been away from employment in hospitals, public health departments, and university health services and toward private practice (9,10). In contrast to NPs and PAs, proportionately fewer CNMs practice in hospitals now than did so in the 1970s: in 1984, only 6.7 percent of the Nation's hospitals had CNMs on staff (171). More than 14 percent of the Nation's CNMs worked in private nurse-midwifery practice in 1982, compared with 2.4 percent in 1976 to 1977 (9,10).

CNMs are finding increased employment where they are not administratively responsible to physicians. Administrative independence must not be confused with clinical independence, because CNMs do not aspire to clinical independence. They highly value their professional interdependence and collaboration with physicians (13).

Although most NPs and PAs in primary care are supervised directly by physicians, only 48 percent of the CNMs practicing in the United States who responded to the 1982 ACNM survey indicated that their immediate supervisors were physicians. All the responding CNMs, however, collaborated on clinical matters with physicians (10). The proportion varied considerably depending on the type of practice. For example, about 9 of every 10 CNMs in private practice with physicians were supervised directly by physicians, whereas approximately one-third of hospital-based CNMs were under the supervision of physicians. Almost half the CNMs in private nurse-midwifery practice were not administratively responsible to anyone other than themselves, and an additional 22 percent reported to other nurse-midwives. In all, nearly 36 percent of the respondents noted that they were supervised directly by other CNMs (10).

The evidence suggests that CNMs—especially those in private nurse-midwifery practice—tend to function organizationally more independently of physicians than do NPs or PAs. Because of the sixfold increase in the percentage of CNMs working in private nurse-midwifery practices between 1976-77 and 1982, the organizational independence of CNMs has increased markedly. This trend shows no signs of slowing down, although all obstetrics-related care may be decreased by the liability-insurance crisis.

SUMMARY

Studies show that NPs, PAs, and CNMs can provide services that both substitute for and complement physicians' services, depending on the particular service or type of practice. Moreover, hiring an NP, PA, or CNM increases a practice's total output and costs less than employing an additional physician. Because training is less costly for these practitioners than for physicians, using NPs, PAs, and CNMs rather than physicians for certain services would presumably be cost-effective from a societal point of view, given that the quality of care is equivalent to that provided by physicians for comparable services (see ch. 2). Although additional cost savings might result from greater employment of these providers, the evidence suggests that current employment levels and practices more or less reflect existing market conditions.

The abilities and cost-effectiveness of NPs, PAs, and CNMs raise a question as to why their ranks have not grown and diffused to a greater extent. Although the private markets for NPs, PAs, and CNMs as employees in physicians' practices do not suggest a current shortage, the removal of payment barriers and limitations could greatly increase the demand for these alternative practitioners. Unless the barriers are altered, the potential savings from a greater use of NPs, PAs, and CNMs will probably remain unexploited.

Continuing research and analysis is needed to ascertain the cost savings that would result from increased employment of NPs, PAs, and CNMs. Many productivity studies have been conducted, but few attempts have been made to compare how NPs, PAs, or CNMs affect the revenues of individual practices with how they affect the practices' costs. Changing market circumstances create a need for both types of studies, but those that compare revenues and costs are especially important.

Chapter 5

Payment Issues

Chapter 5

Payment Issues

In their areas of expertise, nurse practitioners (NPs), physician assistants (PAs), and certified nurse-midwives (CNMs) can provide safe care that meets generally recognized standards of quality, care that emphasizes personal and preventive dimensions often underemphasized by physicians, and care that would otherwise be unavailable in inner cities, remote areas, and certain settings where demand or ability to pay are insufficient to support physicians' practices. NPs, PAs, and CNMs could also reduce costs in certain settings.

Nonetheless, professional attitudes and restrictive statutes, regulations, and policies have hindered the ability of NPs, PAs, and CNMs to obtain employment in some settings and to practice at levels commensurate with their training (see box 1-A). One major constraint is that *many third-party payers*, including many Federal programs, *do not cover (authorize payment for) services provided by NPs, PAs, and CNMs in certain settings, if the services are typically and characteristically provided by physicians nor do they pay them directly for such services* (see app. B). Although most third-party payers usually do not look beyond a physician's claim for payment as to whether the physician or NP, PA, or CNM have provided a particular service, uncertainties about coverage are partly responsible for some physicians' reluctance to hire NPs, PAs, or CNMs. Lack of direct payment limits the independent practice of NPs and CNMs. Third-party payers have been more generous in covering and directly paying for the services of CNMs than NPs. Although PAs, as well as NPs and CNMs, have actively sought coverage for their services, they differ from NPs and CNMs in not wanting direct payment.

Observers have suggested modifying the current rules for payment of such services by requiring coverage for NP, PA, and CNM services and by paying NPs and CNMs directly and not through the employing physician. Requiring coverage would be both an independent modification and a preliminary step toward direct payment. A third modification—establishing a payment level—could apply even if payment were indirect, i.e., to the NPs', PAs', or CNMs' employer.[1] These modifications would have several implications for employment and the scope of practice of these practitioners[2] and for the costs borne by third parties, patients, and society.

Some Federal health programs and private insurers provide coverage and direct payment for the services of NPs, PAs, and CNMs in some settings (see app. B). For purposes of analysis, this case study assumes that coverage and direct payment for such services would be offered by *all* the programs and insurers and that any new Federal legislation would not override State laws or regulations governing the licensing and practice of NPs, PAs, and CNMs.

The effect of the modifications would vary, depending on the setting in which the provider practiced and on the method of payment. Because these two factors are interdependent—in that payment method is usually typical of a type of practice setting—they are considered together.

The effect of these modifications also depends on the health-care environment, which is changing. The supply of physicians and the organization and financing of health care are changing in ways that are likely to bring about a more competitive market for health-care services.[3] These trends have implications for the future of NPs,

---

[1] During the publication of this case study, the Omnibus Reconciliation Act of 1986 (Public Law 99-509) was enacted. The act modifies Medicare and authorizes payment for (covers) services of physician assistants working under the supervision of physicians in hospitals, skilled nursing facilities, intermediate-care facilities, and as an assistant at surgery. The payment is indirect and at levels lower than physicians would receive for providing comparable services.

[2] Many other factors affect the employment and practice patterns of NPs, PAs, and CNMs. Several issues, especially *malpractice insurance*, are *critical*, but a discussion of them would be beyond the scope of this case study.

[3] The fact that the U.S. population is aging and consequently needing more health-care services would also affect the employment of NPs and PAs and, to the extent that they provide gynecological services, CNMs. The aging of the population has been discussed in detail in a number of previous OTA reports, notably in *Technology and Aging in America* (245).

PAs, and CNMs, regardless of whether payment for their services changes. Modifying payment for the services of NPs, PAs, and CNMs in a changing health-care environment, however, would certainly affect their employment and use and might alter the costs of health care.

EFFECTS OF MODIFYING PAYMENT FOR SERVICES OF NURSE PRACTITIONERS, PHYSICIAN ASSISTANTS, AND CERTIFIED NURSE-MIDWIVES

Modifying the method of payment could be expected to have varying effects on the employment and scope of practice of NPs, PAs, and CNMs, depending on whether they were in independent practices or worked in physicians' practices, health maintenance organizations, hospitals, nursing homes, or other settings. Modifying the method of payment might also affect costs.

Effects on Independent Practices of Nurse Practitioners and Certified Nurse-Midwives

Mandated coverage and direct payment to NPs and CNMs for providing services typically and characteristically performed by physicians would dramatically increase NPs' and CNMs' ability to establish fee-for-service practices that were administratively independent from physicians. Indeed, direct payment would be the most advantageous payment method for NPs or CNMs in independent practices. As autonomous providers, NPs and CNMs could provide the full range of services for which they were trained and licensed.

Such practices would be *administratively* independent but according to current modes of practice, they would not be *clinically* independent from physicians when NPs and CNMs were performing delegated medical tasks.[4] The nursing profession has agreed to clinical collaboration. For example, a joint statement of "practice relationships" calls for obstetrician/gynecologists and CNMs to adhere to clinical-practice arrangements that include the participation and involvement of obstetrician/gynecologists with CNMs as mutually agreed on in written medical guidelines or protocols. CNMs in administratively independent practice believe that they are adhering to the joint statement, because it permits interdependent practice without calling for physicians to be present whenever CNMs are caring for patients (13). In addition, the American College of Nurse Midwives requires that CNMs agree to work in clinical collaboration with physicians in order to obtain certification.

In addition to professional restraints, State laws and regulations that limit NPs' and CNMs' scope of practice and specify requirements for supervision by physicians serve as a formal control on clinical independence. NPs and CNMs in independent practice are also accountable for their mode of practice by the malpractice insurance they carry.

Although a few NPs have attempted to establish administratively independent practices, most NPs in such practices provide traditional nursing care rather than primary medical care (138). Among the barriers NPs face in undertaking independent practices are the necessity of making substantial financial investments and the lack of coverage and direct reimbursement for their services. The American Nurses Association (ANA) believes that many NPs would establish such practices if coverage and direct payment were more widely available (256).

CNMs are highly interested in administratively independent practice. Indeed, the proportion of CNMs in private midwifery practices increased from 2.4 percent in 1976 to 1977, to 14 percent in 1982 (9,10). During that period, the number of third-party payers that provided coverage and direct payment for CNMs' services increased. If additional third-party payers were to cover and pay for these services, more CNMs probably would be interested in independent practice.[5]

---

[4] NPs and CNMs may legally be clinically independent from physicians when performing nursing tasks.

[5] Problems with obtaining malpractice insurance coverage and high malpractice premium costs are significant limitations on independent practice by CNMs.

How coverage and direct payment for NPs' services would affect the establishment of administratively independent fee-for-service practices by NPs partly depends on the extent to which NPs seek and obtain direct payment. The impetus for direct third-party payment of nurses, an ANA priority since 1948, increased for organized nursing with the establishment of NPs as health practitioners (22). Indeed, the ANA has been actively involved in seeking and sometimes obtaining such payment at the State and national levels (23,232).

Little information is available as to how many practicing NPs receive direct payment. A 1983 survey of NPs, conducted 4 years after the passage of a Maryland law providing direct third-party payment for services not directly supervised by physicians, found that fewer than 1 percent were paid directly (99). In 1986, however, 7 years after the passage of similar legislation in Oregon, a survey of NPs in that State found that 25 percent were receiving direct third-party payment; 42 percent had been issued provider numbers; and 38 percent were signing the claims forms for the services they provided (102). The researcher who conducted both surveys suggests that the disparate findings might reflect the fact that more time had elapsed between the passage of the legislation and the survey in Oregon than had elapsed in Maryland (101).

The establishment of independent fee-for-service practices by NPs and CNMs could affect the costs of third-party payers. If the total volume of services by all providers did not increase, setting payment levels for services provided by NPs and CNMs lower than levels for comparable services provided by physicians might decrease the costs of third-party payers. Of course, the size of any savings to third-party payers would depend on the size of the gap between payment levels for physicians and payment levels for NPs and CNMs. Paying NPs and CNMs 10 percent less than physicians are paid would have a minimal effect on third-party costs in the immediate future, in part because the number of NPs and CNMs is so much smaller than the number of physicians. Savings to third-party payers would also depend on the extent to which patients chose to patronize NPs and CNMs in independent practices.

Patients' costs might be lower if the NPs and CNMs charged their patients lower fees than physicians charged for comparable services. For most primary care services, e.g., office visits, savings to most patients would be small, because fees for such services are not high and third-party payments cover a large part of them. Savings for maternity care could be appreciable however, because charges and patient liability for such services are high. Coverage and direct payment would allow patients to choose NPs and CNMs as providers without being penalized financially by lack of reimbursement.

Any savings to third parties and patients might be decreased or negated by duplicative visits. Patients who sought care from NPs or CNMs in independent practices might also see physicians for the same or related care, on their own initiative or on referral by NPs or CNMs. Seeing both physicians and nonphysicians could result in duplication of examination and laboratory procedures.

Although NPs and CNMs in independent practices could lower societal costs for health care, the extent of the savings is difficult to estimate. Societal costs would reflect, among other things, any decreases in program costs and beneficiary costs and any savings resulting from NPs' and CNMs' care that reduced the need for care in the future. For example, although CNMs might not find it feasible to charge patients lower fees than physicians charge (because CNMs spend so much more time with patients than physicians spend), CNMs might lower societal costs by decreasing the need for expensive neonatal intensive care for infants of women whose socioeconomic status puts them and their infants at high risk (193).

Scant evidence is available as to how much NPs in independent practices charge their patients. In an exploratory phase of a survey of Maryland NPs, Griffith (99) found that the median fees charged by NPs in independent practice were lower than the median fees charged by physicians for most services. However, 59 percent of NPs' fees were the same as physicians' fees for all types of visits (99). Charging lower fees than physicians charge for similar services appears to be the norm for NPs in many types of settings other than independent practice. Brooks (36) reported that the fees charged by NPs in rural satellite settings are lower than those charged by a sample of rural physicians. Several national studies of NPs in organized settings confirm this finding (256). Patients were generally charged less for visits to Oregon NPs who received direct payment either in independent practices or in physicians' fee-for-service practices than for visits to salaried NPs (102). The difference between the charges for short initial visits and brief followup visits was statistically significant. Furthermore, charges for visits to NPs were lower than for visits to physicians in both Oregon and Maryland. The difference between charges for NPs and those for physicians was greater in Oregon than in Maryland, perhaps because the proportion of NPs receiving direct payment was greater in Oregon than in Maryland (102).

Whether NPs would increase their fees if they were in independent practice and received direct payment is unclear, although some evidence indicates that other groups that provide services typically provided by physicians have gradually increased their fees to the level of physicians' fees after receiving direct payment. The American Psychiatric Association (APA) has reported two studies that found this phenomenon to be true of psychologists and clinical social workers (256).

Some private insurers report that their total costs from CNMs for maternity care are lower than those from physicians. Of course, physicians' care includes care for complex cases that require more resources than normal maternity care. However, Mutual of Omaha has noted that CNMs provide a "valuable service at a reduction in costs from that charged by medical doctors or osteopaths," and the Blue Cross and Blue Shield Association found that CNMs were less costly than physicians in *normal* maternity care (256). Indeed, based on the current status of direct payment for services, insurers of CNMs appear to be less resistant to coverage and direct payment than do insurers of NPs (see table B-1). Insurers, such as Mutual of Omaha and Blue Cross, perceive that NPs would provide services in addition to those normally provided by a physician, whereas CNMs provide services that substitute for physicians' services (256).

Charges for CNM services in independent practice appear to vary by region—in some areas their fees are lower than those of physicians, and in other areas they are about the same (79). CNMs charge slightly less than obstetricians for normal maternity care (98) when services are provided in independent birthing centers (103,149). The total costs of maternity care by CNMs may also be less than total costs for care by physicians for similar cases, not necessarily because CNMs have lower fees, but because the care they provide is usually technologically less complex than physician care (98,201).

Costs to patients, third-party payers, and society would also be influenced by changes in the volume of services provided as a result of coverage and direct reimbursement for new providers. Historically, insurance companies have contended that covering and directly paying additional provider groups in fee-for-service settings increases the volume of services provided by the new providers, the physicians, or both and, consequently, increases costs for third-party payers, beneficiaries, and society. The evidence to prove or refute this argument is equivocal (246). The recent emphasis that public and private third-party payers have placed on monitoring the volume of health-care services may help to control potential increases in volume.

Direct evidence is unavailable as to how coverage and direct payment would affect the volume of services provided by NPs and CNMs. Indirect information, which consists only of anecdotal reports of private insurers' experiences with other groups, is conflicting. Mutual of Omaha and other insurers report that chiropractors increased their provision of services to consumers after being authorized for direct reimbursement but that psychiatric social workers did not increase theirs (256).

Whether coverage and direct payment for services by NPs and CNMs would increase the provision of services by physicians is unclear. Physicians might change their behavior in response to competitive providers. If NPs and CNMs charged their patients lower fees, some physicians might decrease their fees in order to compete but, to maintain their incomes, might increase the number of services they provided to their patients (inducing demand for services). Although research on physicians' influence on the volume of services has been conducted for many years, none of the studies positively proves the magnitude or even the existence of induced demand for services (246). In the past, however, physicians in the United States and Canada have maintained their income level even with substantial increases in the supply of physicians (28).

Effects on Physicians' Practices

In the 1970s, a major reason cited by physicians as a disincentive to employing NPs, PAs, and CNMs was that Federal payment policies did not authorize payment for services provided by NPs, PAs, and CNMs (138). Whether mandating coverage for such services would increase incentives for physicians in fee-for-service practices to employ these practitioners and delegate more services to them depends on several factors, including physicians' billing practices and the payment levels for NPs', PAs', and CNMs' services. The higher the payment level, the greater the monetary incentive a physician would have to employ an NP, PA, or CNM, but simultaneously the cost-saving potential to the third-party payer would decline.

Providing coverage and payment for the services of NPs, PAs, and CNMs (at any level) would increase practice incomes for physicians who have employed these practitioners without billing for their services. Such physicians might increase the range of services they delegate to NPs, PAs, and CNMs. Third-party payers' costs would probably increase, regardless of whether the practices' volumes of services increased. Whether increases in practice income would be passed on to patients in the form of lower fees is unclear.

If services by NPs, PAs, and CNMs were authorized for payment, physicians' practices that currently do not employ such practitioners might be more inclined to employ them rather than hire additional primary-care physicians. If the payment level was 100 percent of what a physician would receive for providing a comparable service, third-party payers probably would incur higher costs for such practices regardless of whether the new employees were NPs, PAs, CNMs, or physicians. If the payment levels set for NPs', PAs', or CNMs' services were lower than those set for physicians' services, the costs to third-party payers would be lower if NPs, PAs, or CNMs, rather than physicians, were employed.[6]

However, authorizing payment for NPs', PAs', and CNMs' services would not necessarily increase the opportunities for these providers to become salaried employees in physicians' practices. Allegations have been made that many physicians' practices, knowingly or unknowingly, submit bills under the physicians' provider numbers for uncovered NPs', PAs', and CNMs' services. The bills are seldom challenged by third-party payers. If the payment levels were the same for the services of NPs, PAs, and CNMs as for the employing physicians, coverage of NPs', PAs', and CNMs' services would not affect the revenues of physicians' practices that were already billing for such services. In these practices, coverage probably would affect neither the employment opportunities for NPs, PAs, and CNMs nor the services physicians delegated to such practitioners.

The revenues of these practices would decrease, however, if the payment levels were significantly lower for NPs', PAs', and CNMs' services than for physicians' services, if the volumes of services remained the same for the practices, and if the physicians billed for the services of NPs, PAs, or CNMs under the NPs', PAs', or CNMs' provider numbers. How physicians would respond to decreases in their practices' revenues is unclear, but employment opportunities for NPs, PAs, and CNMs might be jeopardized. The physicians might increase the volumes of services provided by their practices.

Coverage of NPs', PAs', and CNMs' services would not affect third-party costs if the number of services provided by practices remained stable; i.e., if the practices had billed for services under the physicians' provider numbers before coverage was expanded, and if the payment levels were the same for NPs, PAs, and CNMs as for the employing physicians. If the payment levels were lower for NPs, PAs, and CNMs than for physicians, third-party payers' costs for such practices might decrease. For physicians' practices, as for NPs' and CNMs' independent practices, the size of the difference between the payment levels for services provided by NPs, PAs, and CNMs and for comparable services provided by physicians would partly determine how lowering the payment level would affect the costs of third-party payers.

---

[6] It is not clear whether or not NPs would accept payment levels lower than those of physicians. As noted earlier, PAs are willing to accept levels of compensation lower than those of physicians.

Because data do not exist as to how physicians bill for the services of NPs, PAs, and CNMs, the overall effect that required coverage would have on NPs', PAs', and CNMs' employment opportunities in physicians' fee-for-service practices is uncertain. Coverage might influence employment indirectly. NPs have argued that coverage establishes a collegial professional relationship. Furthermore, they claim that coverage can cause physicians to see that NPs', PAs', and CNMs' services generate revenue as well as costs (98). This perspective might increase the employment potential of these practitioners (98).

Direct payment would only indirectly affect the employment of NPs and CNMs as salaried employees of physicians. Direct payment would allow NPs and CNMs to choose to work as salaried employees, to undertake independent practices, or to enter into joint practices with physicians (i.e., partnership arrangements by NPs or CNMs with physicians). Paying NPs in physicians' practices directly, rather than indirectly, could be expected to decrease the fees for patients' visits to NPs (102).

Effects on Health Maintenance Organizations

Because most third-party payers in the public and private sectors currently provide coverage for the services of these practitioners in health maintenance organizations (HMOs) (see table 1-1), extending coverage is largely irrelevant to their employment in this setting. Also, most HMOs pay NPs, PAs, and CNMs a direct salary, which makes the issue of direct payment of little importance in the HMO setting.

The data suggest that NPs, PAs, and CNMs save costs for HMOs:

> It is to their [HMOs] financial advantage to produce services with the most efficient combination of inputs, substituting lower priced physician extenders for higher priced physicians whenever possible (138).

Furthermore, past experience with HMOs has shown that:

> . . . capitation[7] plans do care for [non-Medicare] enrollees at lower costs while maintaining quality at levels equal to or better than comparison practices (246).

Effects on Hospitals

Payment for services delivered in inpatient hospital settings by NPs, PAs, and CNMs who are hospital employees is most commonly made either retrospectively on the basis of cost or prospectively on the basis of diagnosis-related groups (DRGs). There is no statutory permission or lack of permission under Medicare or Medicaid for payment of NPs', PAs', and CNMs' services as inpatient hospital services when the providers are employed by the hospitals. Most other third-party payers are also silent on this issue. Moreover, hospitals usually pay a salary to NPs, PAs, and CNMs that they employ.

Medicare, Medicaid, and most other third-party payers pay hospitals for total operating costs, and most hospitals' accounting systems simply lump the costs of NPs', PAs', and CNMs' services together with other types of operating costs. Nurses contend that coverage and direct payment as well as the identification of the services that coverage and direct payment would require, would influence hospitals interest in them as employees. Delineating the costs of these services might facilitate internal management decisions. Nurses have advocated the identification of the costs of nursing services in institutional settings, believing that identification would increase nurses' autonomy, encourage economic decisionmaking, enhance nursing efficiency, and spur hospital administrators to recognize that nurses generate revenue as well as costs (22,98,162). Nurses believe that recognition of their revenue-producing abilities could increase their employment opportunities in hospitals (161).

---

[7] Capitation is a method of paying for medical care, in which a per capita amount is paid prospectively for all services received by an enrollee or beneficiary during a given period of time. The payment is not related to the quantity of service provided. Capitation payment provides financial incentives to use resources more efficiently and even to underuse services.

Extending coverage and direct payment for the services of NPs, PAs, and CNMs as hospital employees in the inpatient hospital setting most likely would require that the costs of the services be paid for as professional services, the category under which Medicare and other third-party payers currently pay for physicians' services. Such a move would run counter to most current thinking, espoused in both the public and private sectors, which is focused on containing costs by aggregating services. For example, some observers have expressed interest in aggregating physician services by adapting the DRG approach,[8] particularly for hospital-based physicians (63,165). The Omnibus Reconciliation Act of 1986 (Public Law 99-509), however, has extended direct payment for anesthetic services rendered by certified registered nurse anesthetists in hospitals. These services were originally to be paid for under Medicare as a component of a DRG but were passed through as a hospital cost.

Coverage of their services would affect the employment of PAs who are employees of physicians or physicians' practices but who work as surgical assistants in hospitals.[9] PAs assist in performing surgical procedures and also provide preoperative and postoperative care (7). Medicare does not cover PAs' provision of such procedures and care, although Medicare currently covers and pays at amounts equivalent to 20 percent of the surgeons' fees for the services of physicians who act as assistants at surgery. Some observers have expressed concern that the lack of coverage has restricted PAs' employment and the delegation of appropriate services to PAs at surgery. Using PAs rather than physicians as surgical assistants reduces practices' costs, but whether the savings are passed on to patients is unclear.

Photo credit: Geisinger Medical Center and the American Academy of Physician Assistants

PAs provide post-operative care as well as pre-operative care and assisting in performing surgical procedures.

Effects on Nursing Homes

Because virtually all NPs and PAs working in nursing homes are salaried employees, their employment would not be necessarily affected by coverage of their provision of services typically provided by physicians.[10] With coverage, NPs and PAs could supply primary-care services in nursing homes as employees of physicians' practices or as team members in group practices providing visits to nursing homes.[11] If NPs were paid directly, they could supply primary-care services to nursing homes as independent practitioners, similar to physical therapists.

---

[8] Under the DRG approach, Medicare pays a fixed amount for the operating costs associated with treating patients in each diagnostic category. In applying the DRG approach to physicians, the payment unit would be a bundle of services rather than an individual service. This approach could control both costs and utilization by reducing the number of service units billed and encouraging the judicious use of services within packages.

[9] During the publication of this case study, the Omnibus Reconciliation Act (Public Law 99-509) was enacted. The act modifies Medicare and authorizes coverage of a physician assistant services furnished under the supervision of a physician as an assistant at surgery. The payment to the employer will be 65 percent of the reasonable charge for a physician when acting as an assistant at surgery and will be effective after Jan. 1, 1987.

[10] Several other Medicare and Medicaid regulations specific to nursing homes limit the role of NPs and PAs and specify services that must be performed by physicians in order for the nursing homes' services to be covered (see app. B). Many States have passed laws to "permit the delegation of these services by a physician to a physician assistant or nurse practitioner" (116). However, strict interpretation of these and similar rules prohibits the appropriate use of NPs and PAs in nursing homes. In addition to permitting coverage under Medicare and Medicaid, amendments to these regulations would be required in order for NPs and PAs to be used appropriately.

Many nursing homes have difficulty supplying primary-care services because few physicians are interested in visiting patients in nursing homes to provide services (166). Furthermore, most physicians are poorly prepared to care for seriously ill elderly patients. The growing number of elderly people in our society, particularly those over 85 who most frequently need nursing-home care, has increased concerns about the quality and costs of such care. Many residents are medically stable but functionally impaired by chronic physical or mental conditions. Other residents are admitted from hospitals for recuperation and rehabilitation following surgery, or are terminally ill and do not require hospital care (245). NPs and PAs are uniquely suited to provide the types of care needed by nursing home residents with chronic conditions and their associated disabilities (see chs. 2 and 3).

Except when more intensive care can be substantiated, the number of physician visits to nursing homes is limited under the Medicare program. Extending coverage, therefore, might not increase the costs attributable to nursing-home visits for third-party payers, assuming payment levels were the same, or lower, for the NPs and PAs as for the physicians. When physician-NP teams, rather than physicians alone, visited nursing homes, however, total costs to third-party payers were shown to decrease, mainly because of lower rates of hospitalization and fewer visits to physicians or clinics (128). A 1980 and 1982 study found that, as compared with physicians alone, a group practice of salaried physicians, NPs, and PAs showed substantially lower overall medical costs for nursing home residents even though the number of visits to the homes were not limited. Savings were realized from decreases in expensive hospital-based emergency and outpatient services and in the numbers of hospital days used (155,257). Furthermore, the quality of care increased, and the NPs acted as patients' advocates.

Although payment changes are a necessary step, innovative approaches to improving the care and reducing the costs associated with nursing homes need to include modifications of regulations concerning visit limitations and changes in other Medicare and Medicaid regulations that limit the role of NPs and PAs in nursing homes.

THE CHANGING CONTEXT OF HEALTH CARE

Financing

A growing trend is to set payment rates for health services before, rather than after, they are delivered. Prospective payment has been adopted in response to rapidly rising health-care costs and the recognition that cost increases have been partly caused by retrospective reimbursement. One of the most innovative approaches is Medicare's method of paying for beneficiaries' inpatient care on the basis of DRGs.

The other major trend is increased interest in the use of capitation, in which a per capita amount is set prospectively for all medical services received by an enrollee or beneficiary during a given period. The health-care organization receives its payment, the amount of which is not related to the quantity of services provided, and must then pay physicians and other providers. Capitation payment provides financial incentives to prevent high-cost problems and to deliver services at low cost. Acceptable standards of care, or at least patient satisfaction, are essential if capitated plans are to maintain enrollment at sufficiently high levels to maintain financial viability (246).

Supply of Physicians

In the mid-1960s, public policy in the United States began to focus on counteracting the shortage and maldistribution of physicians. As a result, the number of medical schools increased from 89 in 1965 to 127 in 1984 (255), and the number of first-year medical students nearly doubled (240,255). Expected increases in the numbers of graduates from U.S. medical schools, combined with graduates of foreign medical schools, are resulting in physician surpluses, which the Graduate Medical Education National Advisory Committee predicts will be significant by 1990. Since 1982, enrollment in medical schools has declined slightly, as the Federal Government has reduced both its funding of subsidized loans for medical students and its support of medical schools (58). The growth rate in the supply of foreign medical graduates also is expected to decrease (255), but the effect of past efforts to increase the supply of physicians will be felt well into the next century.

---

[11] During the publication of this case study, the Medicare law was changed as a result of the enactment of the Omnibus Reconciliation Act of 1986 (Public Law 99-509) during October 1986. The act authorizes the coverage of the services of PAs furnished under the supervision of a physician in skilled nursing facilities and intermediate-care facilities in States where the physician assistant is legally authorized to perform the services. The payment to the employer is to be at 85 percent of the prevailing charge of physician services for comparable services provided by a nonspecialist physician.

Observers expect increases in the number of physicians to significantly outpace population growth. For every 100,000 people in the United States, there were 148 physicians in 1970 and 218 in 1983 (255). Estimates for 1990 range from 215 (240) to 224.4 (255) per 100,000. Estimates for the year 2000 range from 240 (240) to 245.2 (255) per 100,000.[12] From 1981 levels, the numbers of physicians in primary-care specialties, including obstetrics and gynecology, are expected to have increased 28 percent by 1990 and 53 percent by 2000, outpacing the growth in the total supply of physicians (255). Although the need for physicians is expected to increase, the supply of physicians is expected to exceed the need by 1990, according to all estimates (94,240,251,255).

Delivery Sites and Organizations

In 1983, for the first time, the main practice arrangement of less than half (48.9 percent) of all physicians in the United States was solo practice. Only 8 years previously, more than 54 percent of the Nation's physicians practiced individually. In 1984, the number of group practices (three or more physicians) was over 15,000—up 44 percent since 1980 (16). The number of physicians in group practices during the same period increased from 88,290 in 1980 to 140,213 in 1984 (4). Some physicians join group practices because the practices are established, they entail less financial risk than solo practices, and they provide access to the capital required for purchasing and using sophisticated medical technology (16). Group practices may be even more attractive to physicians in the future for a number of reasons including the capital required to purchase expensive technology and increased competition.

The types of organizations in which physicians practice—with or without other health-care providers—have also increased. HMOs have been growing rapidly in recent years. Enrollment in HMOs grew by 25.7 percent in 1985 to a total enrollment of 21 million (123). Although Individual Practice Association (IPA) models outnumbered all other kinds of HMOs combined, group-model plans retained the lead in enrollment (123). That enrollment is expected to increase rapidly in the next 5 years. Estimates of total enrollment in HMOs range between 25 and 50 million for 1990 (241). Part of the growth in HMOs has been attributed to the increased willingness of physicians to be employed in them (240). Recent changes that might affect the employment and use of NPs, PAs, and CNMs in HMOs are the increasing involvement of for-profit corporations in HMOs, and the joint purchasing and other cost-saving ventures undertaken by groups of HMOs (246).

Preferred-provider organizations (PPOs) include several types of arrangements between third-party payers and health-care providers, including physicians, hospitals, or both. In these arrangements, providers contract with insurers or employers to deliver care at reduced prices. The first PPO was organized in 1978; by June 1985, 334 had been organized and 229 were operating (118). Although PPOs were designed to reduce expenditures, no evidence currently exists that the care they deliver costs less than that delivered by other types of organizations.

The delivery of health services is also affected by the growth of the multihospital system—two or more hospitals owned, leased, controlled, or managed by a single for-profit or not-for-profit corporation. Indeed, the multihospital system has become an important component in the changing health-care-delivery system. Some 35 percent of the Nation's hospitals and 38 percent of all community hospital beds are now in multihospital systems (14). Since 1976, the number of multihospital systems has increased by more than 60 percent (2). A few observers believe that the growth of the for-profit component will eventually result in most services being provided by a few nationwide suppliers that might appropriately be labeled "megacorporate health care delivery systems" (85).

---

[12] The total number of physicians in 1970 was 334,028 and in 1983 was 519,546 (255). Estimates for 1990 range from 537,750 (240) to 555,300 physicians (255). Estimates for 2000 range from 642,950 (240) to 655,920 physicians (255).

Another trend is toward increasingly diverse sites for providing care (see table 5-1).[11] For example, the first free-standing center was established in Delaware in 1973. By July 1984, there were an estimated 1,800 such centers in the United States and the total is projected to grow to approximately 4,500 by 1990 (152). In late 1983, about 9 percent of the Nation's physicians worked an average of about 13 hours per week in free-standing centers providing primary or emergency care. Some of these centers were operated by hospitals or chains and others operated independently (16).

Table 5-1.—Selected Alternatives to Traditional Health-Care Delivery

I. ***Alternative sites:***
- Alcohol and drug abuse centers
- Ambulatory care centers
- Ambulatory surgical centers
- Birthing centers
- Diagnostic imaging centers
- Freestanding emergency centers
- Hospices
- Mammography centers
- Nurse-managed centers
- Nutritional dietary centers
- Oncology centers
- Pain management centers
- Psychiatric centers
- Rehabilitation centers
- Sports rehabilitation centers
- Student health centers
- Wellness programs

II. ***Alternative organizations:***[a]
- Competitive medical plans
- Extensive provider organizations
- Health maintenance organizations
- Independent practice associations
- Preferred provider organizations
- Social health maintenance organizations

SOURCE: Office of Technology Assessment, 1986.

Effects of Changes in the Health-Care Environment on Nurse Practitioners, Physician Assistants, and Certified Nurse-Midwives

How changes in the health-care environment will affect the integration of NPs, PAs, and CNMs in the health-care system is unclear. The changes, which generally reflect trends toward cost-containment and increased competition, are interdependent. For example, the increasing supply of physicians has heightened competition among medical-care providers (19,176,205,206), leading many young physicians to accept salaried positions and to enter into contractual arrangements with third-party payers (19,240). The number of physicians in salaried positions is twice as great for those in practice 5 years or less as for those in practice 6 years or more (18). In effect, the increasing supply of physicians is an important factor in changing medical practice arrangements in the United States and in fostering a willingness to practice in fee-for-service groups and in capitated and institutional settings, which many physicians avoided only a few years ago.

Competition in the health-care system could either limit or expand employment opportunities for NPs, PAs, and CNMs. Competition resulting from the growing supply of medical-care providers might reduce such opportunities, especially in physicians' office-based, fee-for-service practices. Physicians with declining patient bases might not have enough patients to justify employing additional providers (97). However, the American Medical Association (15) notes that, faced with increasing competition, rising practice costs, and cost-conscious patients, physicians are concerned about the cost-effectiveness of their practices and might attempt to improve the practices' productivity and increase the practices' income by employing NPs, PAs, and CNMs. Compared with practices that do not employ NPs and PAs, physicians' practices that do employ NPs and PAs have higher numbers of patient visits per hour and per week and higher incomes for the employing physicians (17). Because such practices charge lower fees per office visit (17), they might be more competitive with other practices. Physicians might also attempt to attract more patients by expanding the range of the services provided by their offices, which could enable NPs and PAs to practice the full range of services for which they were trained.

---

[11] See *Medical Technology and Costs of the Medicare Program* (244) for a more detailed description of alternative sites of care.

Some physicians, however, might find it economically more advantageous to hire new physicians rather than NPs, PAs, or CNMs. The rate of growth in physicians' incomes has started to decline, a trend that is expected to continue (20). If new physicians' incomes decline sufficiently, and if their interest in salaried positions continue to increase, they might be more attractive than NPs, PAs, or CNMs to established physicians who want to expand their practices.

Competition among different types of health-care organizations might increase the employment and responsibilities of NPs, PAs, and CNMs (15, 143,144). For example, the growth of risk-sharing HMOs—which have used the services of NPs, PAs, and CNMs extensively in the past—would seem to ensure a larger role for these providers in the health-care system. But like physicians' practices, HMOs could turn instead to physicians, if their incomes are reduced enough. Anecdotal reports from California note "that clinics that had intended to employ NPs and PAs were having physicians arrive on their doorsteps saying they would work for $30,000 or $40,000" (263). Clinic administrators, then, must consider whether to hire NPs or PAs at $25,000 or to hire physicians for only $10,000 more. In addition to salary, however, other factors might enter into such decisions. NPs, PAs, and CNMs save costs for capitated entities and provide the types of services—health education, counseling, and preventive care—that HMOs emphasize. Indeed, observers generally agree that the opportunities for employment and full use of NPs, PAs, and CNMs are highest in capitated systems.

The increase in the numbers of IPA-model HMOs is another trend that might adversely affect the employment and use of NPs, PAs, and CNMs. Large group- and staff-model HMOs usually provide care at primary HMO sites and employ NPs, PAs, and CNMs because they are cost-saving, and because they provide health education and preventive services that meet standard levels of quality. The IPA model is less likely than other models to employ these practitioners, because the "plan is primarily organized around solo/single specialty group practices," (123) which do not benefit as much from employing and using NPs, PAs, and CNMs as do larger practices.

The trend toward alternative providers, most of whom are profit-making entities, suggests possible new sources of employment. Anecdotal evidence indicates that ambulatory care centers are employing PAs and NPs. A survey of 250 individual ambulatory care centers, owned by 142 private organizations, found that PAs' salaries ranged from $20,784 to $35,000, with an average of $25,946 (172). Humana, Inc., owns 150 ambulatory care centers (Medfirst) and employs NPs only in its high-volume centers, about 5 percent of the total (163). NPs, who receive salaries or hourly wages, have been found to provide standard care and to cost Humana one-third as much as physicians. Nonetheless, the organization perceives a demand from its clients for physician care and does not intend to change its staffing patterns.

The effects of payment changes, such as the DRG approach, on the employment and use of NPs, PAs, and CNMs in hospitals have not yet been well documented. From individual reports, the effects appear to vary among hospitals. Some hospitals have reportedly cut their nursing staffs and reduced the nurses' work schedules because of DRGs (163). Other hospitals reportedly have hired PAs to increase efficiency (48). The different responses were to be expected and might be attributed to differences in patient mix (and thus differences in DRGs), in the costs of the hospitals with respect to specific DRGs, and in DRG rates (based on geographic location—urban or rural). The aggregate effect on the employment and use of NPs, PAs, and CNMs is thus difficult to ascertain.

Reports also indicate that, as a result of DRG payment, some hospitals are dismissing NPs and PAs and shifting portions of their operations to their outpatient departments, where fee-for-service physicians deliver care (117). PAs' advocates suggest that eventually hospitals might seek more efficient outpatient operations and use PAs in an attempt to contain their costs (48). New roles could also emerge for PAs as utilization review specialists or DRG coordinators (48).

Nurses expect that prospective payment and its related cost management will bring about increasing attention to the contribution of nursing services in critical care and transplant units and will result in a much more realistic allocation of dollars for nursing services (233). Also, because prospective payment may result in the early discharge of patients into the community, followup services for patients after they are discharged are assuming increasing importance. Nurse-managed and nurse-owned organizations are emerging to provide nursing services in the community, and nurses are attempting to establish a mechanism of payment for community nursing services (233). NPs are also assuming new roles in managing cases and reviewing the use of hospital services (96).

Studies are not available to show how the growth of investor-owned hospitals and multi-hospital systems has affected the employment and use of NPs, PAs, and CNMs. Studies on the differences in economic performance based on ownership (investor-owned or not-for profit) and system affiliation (affiliated or free-standing) found no significant difference in costs for delivering comparable care to patients (260). Compared with other types of hospitals, investor-owned chain-hospitals had fewer employees per bed, but paid employees—except nurses—more (260). The years studied were 1978 and 1980, when payment methods created incentives for maximizing the costs of providing services. The adoption of prospective payment by Medicare, some Blue Cross plans, and some State Medicaid programs has created incentives for minimizing such costs. In addition, private sector groups—HMOs, PPOs, employers, and insurers—are contracting with selected hospitals on the basis of price.

Hospitals, especially investor-owned hospitals, will need to lower their costs of production in response to the increasingly competitive new environment (194), but investor-owned hospitals are not hiring lower priced personnel, such as NPs, PAs, and CNMs, to substitute for physicians in inpatient settings (95). Indeed, investor-owned hospitals are not employing many physicians, either (170). Investor-owned chains are using department managers, who for fixed-price contracts provide services, including personnel, for hospital departments (95). Because the managers are at risk financially, however, they have incentives to save costs and, therefore, might employ appropriately trained NPs and PAs.

The growth of investor-owned hospitals might signal fewer opportunities for CNMs to be employed in hospital settings. Both system-affiliated and free-standing hospitals treated proportionately fewer maternity patients than not-for-profit hospitals treated (260).

SUMMARY

The employment and use of NPs, PAs, and CNMs would be affected by changes in the methods of payment for their services and by other changes in the health-care system. Examining how particular changes in payment would interact with the other changes provides some indication of what roles NPs, PAs, and CNMs might play in particular health-care settings and how costs might change for health-care providers, patients, and society.

Despite anticipated changes in the methods of paying for physicians' services, fee-for-service will probably remain a major form of payment in the foreseeable future. Allowing coverage and direct payment for the services of NPs and CNMs would significantly help them in administratively independent practices, could stimulate the growth of such practices to the extent permitted by State laws and regulations, and would increase opportunities for NPs and CNMs to provide the full range of services for which they are trained and licensed.

As independent providers, IPA-model HMOs might engage NPs as contractors for primary-care services (100) and CNMs as contractors for maternity services. PPOs also might treat these practitioners as contractors who agreed to provide services at a discounted fee. The opportunities for NPs and CNMs to become contractors might be limited, however, by the increasing supply of primary-care physicians, including obstetricians, and by competition from physicians, who are lowering the amounts for which they are willing to work.

NPs' and CNMs' employment and the full use of their skills in administratively independent practices could decrease costs for programs, beneficiaries, and society. If the numbers of services NPs and CNMs and physicians provided did not greatly expand, and if the payment levels for NP and CNM services remained lower than those of physicians for comparable services, lower program costs would be likely. Furthermore, if the fees to patients reflected the lower payment level, costs to beneficiaries and society might be lower.

In any fee-for-service practice, including one operated by NPs or CNMs, the degree to which costs would decrease would depend on how much lower the level of payment was for these practitioners than for physicians and on the particular service. For example, the Congressional Budget Office found that covering the services of PAs at rates 10 percent below those of physicians would have negligible effects on costs or savings for the Medicare program or for society (177). Even if the savings occasioned by the lower payment level were passed on to beneficiaries, they would have only small incentives to seek treatment from lower priced PAs. At the margin, patients would pay coinsurance of only 20 percent. A reduction in the charge for an office visit from $30.00 to $27.00 would save a Medicare patient only $0.60, an amount that might well be paid by Medicaid or a private Medi-Gap policy and would not provide an incentive to use such services. Similarly, most of the services provided by NPs are primary care services, such as visits, and would likely not provide much saving for a patient. Maternity care, however, is costly and patients' out-of-pocket costs could be high. If CNMs would accept lower payment levels than those of physicians, any savings passed on to the expectant mother would be considerable.

How covering their services would affect the employment and use of NPs, PAs, and CNMs in physicians' fee-for-service practices is unclear. Numerous variables could affect physicians' decision to employ and appropriately use these providers. Such variables include the physicians' billing practices; the payment levels for services of NPs, PAs, and CNMs; the cost differentials between hiring physicians or hiring NPs, PAs, or CNMs; the competitive position of the physicians' practices; the practices' interests in expanding the range of services they provide in order to improve their competitive positions; the abilities—as well as the physicians' perceptions of the abilities—of NPs, PAs, and CNMs to improve the practices' productivity and income, and the physicians' perceptions of the noneconomic benefits these providers could bring to the practices.

Coverage might encourage fee-for-service practices, particularly group practices to use NPs and PAs in settings and for certain populations and settings where appropriate care currently is unavailable or inadequate. For example, physicians have been reluctant to make nursing home visits, and there is no evidence that an increased supply of physicians will decrease their reluctance. The increases in the elderly population and the growth of nursing homes have exacerbated an unmet need for services in this setting. Not only does the training of NPs and PAs enable them to provide the older population with care whose quality is comparable to that of the care provided by physicians, but evidence shows that teams of physician, NPs, and PAs visiting patients in nursing homes provide standard care and reduce total expenditures.[14] Elderly people and children with disabling conditions and other individuals with chronic conditions would also benefit from NP and PA care in the home setting.

The employment practices of HMOs, the health-care setting with significant growth potential, would not be directly influenced by changes in the current methods of paying for the services of NPs, PAs, and CNMs because most public and private third-party payers cover such services in HMO settings. Furthermore, whether payments were direct or indirect to the NP, PA, and CNM, would not be an issue for organizations paid prospectively by a capitated amount.

---

[14] The Omnibus Reconciliation Act (Public Law 99-509) enacted during the publication of this case study provides coverage for services of PAs provided in nursing homes under Medicare.

However, the increase in the number of IPA-model HMOs does affect the employment of NPs, PAs, and CNMs. In 1985, although group model HMO plans retained the lead in total enrollment, IPA model plans outnumbered all other kinds of HMO plans for the first time (123). Because they are primarily solo or single-specialty practices, IPAs are less likely than group model HMOs to employ these practitioners.

The data suggest that NPs, PAs, and CNMs save costs for HMOs. In an increasingly competitive environment, the financial incentives promote passing on to consumers the savings generated by the employment and full use of NPs, PAs, and CNMs. Thus, as the environment becomes more competitive, the employment of these providers in capitated HMOs could benefit society financially. To the extent these providers are used to provide interpersonal care and preventive services, the types of services traditionally incorporated into the practice of these providers and of HMOs, the quality of care will also benefit.

Third-party payers pay hospitals an aggregate sum for operating costs, and the hospitals are responsible for paying salaried employees. Therefore, coverage and direct payment for inpatient hospital services provided by NPs, PAs, and CNMs would not directly affect their employment possibilities. This is especially applicable to Medicare, which pays for inpatient services on a DRG-rate basis. This payment method creates incentives for lowering the cost of resources, and the costs of NPs, PAs, and CNMs are included in calculating the costs of resources. Although coverage and separate billing for their services could clarify their revenue-producing abilities as well as their costs to the employing hospital, the use of these practitioners to provide patient care as hospital employees is likely to decline under DRG-based payment. PAs and NPs could be used in new roles, such as DRG coordinators.

In order for coverage and direct payment to affect the employment of NPs, PAs, and CNMs by hospitals for providing inpatient services, the costs of their services would be billed as professional services. If the payment levels for the services they provided were lower than those for physician's services, and if the volume of services were not increased, savings might be likely for Medicare and—if fees were lowered accordingly—for society. However, if Medicare paid NPs or CNMs for providing services for which hospitals were also paid under the DRG rate, paying for them separately might increase program costs, if DRG payment rates were not changed. Reducing DRG rates to account for eliminating the costs associated with the NPs' or CNMs' services would be extremely difficult because of the lack of data. In any case, because the proportion of the DRG rate ascribed to nursing costs is unknown, the effects of direct payment on organizational, program, or societal costs cannot be determined.

A major change in health-care delivery is the growth of investor-owned hospitals, particularly investor-owned chains of hospitals. These organizations are currently focusing their efforts on attracting medical specialists to their staffs and have evinced no interest in employing NPs, PAs, and CNMs. The advantages of coverage for the services of these providers do not appear to be sufficiently significant to spark such interest.

In the final analysis, it seems that extending coverage for the services of NPs, PAs, and CNMs in at least some settings could benefit the health status of certain segments of the population currently not receiving appropriate care. The immediate effects on third-party costs are unclear, although long-term effects could be a decrease in total costs. The advantages of direct payment for the services of NPs and CNMs are less obvious. Direct payment might encourage qualified NPs and CNMs to move into unserved and underserved areas to expand access to health care.

Appendixes

Appendix A

Methods and Acknowledgments

The study is based on an analyis of information obtained from an extensive review of the literature and from individuals and organizations with relevant experience. An advisory panel of experts with backgrounds in health policy, medical economics, health insurance, medicine, nursing and consumer advocacy defined the goals for the study and suggested source material, subject areas, and perspectives to consider in presenting the material. The drafts of the report were revised to reflect the thoughtful comments of the panel. OTA thanks the panel for its assistance and the following people and organizations for supplying information and reviewing drafts.

Joel J. Alpert
Boston City Hospital
Boston, MA

American Nurses Association
Washington, DC

American College of Nurse-Midwives
Washington, DC

American Academy of Physician Assistants
Arlington, VA

David Banta
The Netherlands

James D. Campbell
University of Missouri
Columbia, MO

James F. Cawley
George Washington University Medical Center
Washington, DC

Katherine H. Chavigny
American Medical Association
Chicago, IL

James Crouch
Utah Department of Health
Salt Lake, City, UT

M.L. Detmer
American Medical Association
Chicago, IL

Karen Ehrnman
American College of Nurse-Midwives
Washington, DC

E. Havey Estes, Jr.,
Duke University Medical Center
Durham, NC

Claire M. Fagin,
University of Pennsylvania
Philadelphia, PA

Carl Fasser
Baylor University
Houston, TX

William Finefrock
American Academy of Physician Assistants
Arlington, VA

Loretta C. Ford
University of Rochester Medical Center
Rochester, NY

Louis P. Garrison
Project HOPE
Millwood, VA

Archie Golden
Chesapeake Health Plan—South Side
Baltimore, MD

Linda Golodner
National Consumers League
Washington, DC

Bradford Gray
Institute of Medicine
Washington, DC

Marie Hawk
Harvard Community Health Plan
Boston, MA

Anita Hegster
Health Care Financing Administration
Baltimore, MD

Martha Hill
Johns Hopkins School of Nursing
Baltimore, MD

Ada Jacox
University of Maryland
Baltimore, MD

Jean Johnson
George Washington University
Washington, DC

Kerry Kemp
Office of Technology Assessment
Washington, DC

Cynthia P. King
American Medical Association
Chicago, IL

Karl Kronebusch
Office of Technology Assessment
Washington, DC

William Larson
Health Care Financing Administration
Baltimore, MD

Kenneth Lease
U.S. Office of Personnel Management
Washington, DC

Charles E. Lewis
University of California
Los Angeles, CA

Joan Lynaugh
University of Pennsylvania
Philadelphia, PA

Nancy March
American College of Nurse-Midwives
Washington DC

Lynn May
American Academy of Physician Assistants
Arlington, VA

Kathy Michels
American Nurses Association
Washington, DC

Evelyn Moses
Health Resources and Services Administration
Rockville, MD

Norbert Nelson
New York University Medical School
New York, NY

Ronald Nelson
American Academy of Physician Assistants
Arlington, VA

Robert Oseasohn
University of Texas
San Antonio, TX

Henry B. Perry
Mountain Medical Center
Clyde, NC

Elaine Power
Office of Technology Assessment
Washington, DC

Robert Ranney
National Rural Health Care Association
Kansas City, MO

Ginette Rodger
Canadian Nurses Association
Ottawa, ON

Gretchen Schafft
American Academy of Physician Assistants
Arlington, VA

Sherry Shamansky
Yale University
New Haven, CT

Jane Sisk
Office of Technology Assessment
Washington, DC

Julie Sochalski
Ann Arbor, MI

Sally Solomon
National League for Nursing
New York, NY

Brenda Splitz
George Washington University
Washington, DC

Margetta Styles
American Nurses Association
Kansas City, MO

Dan Thomas
Health Insurance Association of America
Washington, DC

Marlent Ventura
Veterans Administration Hospital
Buffalo, NY

Judith Wagner
Office of Technology Assessment
Washington, DC

Jerry Weston
National Center for Health Services Research
Rockville, MD

Judith Willis
Health Care Financing Administration
Baltimore, MD

Sidney Wolfe
Health Research Group
Washington, DC

Susan Yates
American College of Nurse-Midwives
Washington, DC

Appendix B

Payment for the Services of Nurse Practitioners, Physician Assistants, and Certified Nurse-Midwives

Health-care services are paid for by individuals and by third-party payers. Third-party payers in the private sector include commercial insurance companies; hospital and medical plans, such as Blue Cross and Blue Shield; prepaid group medical plans, such as health maintenance organizations (HMOs); and others, such as labor unions or employers of insured individuals (106). Specific benefits, exclusions, and limitations on financial coverage vary from one third-party payer to another and differ even among the policies and plans offered by a particular payer. However, State and, to a lesser extent, Federal laws and regulations require private third-party payers to offer some benefits and do not permit them to offer others.

The Federal Government plays a significant role in paying for health-care services under four primary-health-care programs. The government acts as a third-party payer for health care under the Medicare and the Medicaid programs. Although the Health Care Financing Administration (HCFA) is the Federal agency responsible for both Medicare and Medicaid, the two programs differ considerably in their payment practices and covered populations. Medicare is a nationwide health insurance program for the 27.5 million Americans who are at least 65 years of age and for 2.9 million disabled Americans. Part A, the Hospital Insurance Program helps pay for hospital services, related institutional services, and other services. Part B, the Supplementary Medical Insurance Program covers physicians' services and many other medical services. Medicaid is a joint Federal-State program for 22 million low-income persons. The program is administered by individual States under general Federal guidelines, which include mandatory minimum benefits that all States must provide to eligible recipients and optional benefits that individual States may elect to provide to recipients.

The Civilian Health and Medical Program of the Uniformed Services (CHAMPUS), the third medical-benefits program provided by the Federal Government, is administered by the Department of Defense (DOD) (245). CHAMPUS covers nearly 8 million dependents of military personnel, retirees, and dependents of retirees inside and outside the United States (60).

The fourth medical-benefits program provided by the Federal Government is the Federal Employees Health Benefits Program (FEHBP), a voluntary health-care program that provides health insurance for approximately 10 million Federal employees and their dependents. Enrollees receive health-insurance services from more than 300 health-benefit plans under contracts negotiated with the Office of Personnel Management of the U.S. Government (256).

As table B-1 shows, payment for the services of nurse practitioners (NPs), physician assistants (PAs), and certified nurse-midwives (CNMs) varies considerably, in part because of variations in the State laws and regulations that govern these providers' practices and payment. Table B-1 provides a generalized overview of the payment practices of the major third-party payers in the public and private sectors. These practices are described in greater detail below.

Nurse Practitioners and Physician Assistants

Government-Sponsored Programs

Medicare.—Under Part B of the Medicare program, coverage and payment for NPs' and PAs' services are restricted to services not traditionally performed by physicians, to services normally delegated by physicians, and to services performed under the direct supervision of physicians. This provision is commonly termed the "incident to" provision.[1]

> Under this provision, services of nonphysicians may be covered where they are of types which are commonly performed by physicians' office personnel, and are performed by employees of the physician under his or her direct supervision, e.g., giving injections, taking temperatures and blood pressures, performing blood tests, etc. Payment cannot be made, however, for services performed by nonphysicians where the services are of

---

[1] The relevant Medicare Part B regulation prohibits payment for medical services rendered by someone other than a physician except for services that are "furnished as an incident to a physician's professional services of kinds which are commonly furnished in physicians' offices and are commonly either rendered without charge or included in physician's bills." Sec. 1861(s)(2)(A) of the Social Security Act, 42 U.S.C. Sec. 1395(s)(2)(A), 20 CFR 405-231(b).

Table B-1.—Coverage and Direct Payment for Services[a] of Nurse Practitioners, Physician Assistants, and Certified Nurse-Midwives

	Nurse practitioners		Physician assistants		Certified nurse-midwives	
Third-party payer	Coverage	Direct payment	Coverage	Direct payment	Coverage	Direct payment
Medicare:						
Part A	No	No	No	No	No	No
Part B	No	No	No[b]	No	No	No
HMOs[c]	Yes	NA	Yes	NA	Yes	NA
State Medicaid programs[d]	Some programs	A few programs	Some programs	None	Almost all programs	Almost all programs
Medicare and Medicaid:						
Rural Health Clinics	Yes	No	Yes	No	Yes	No
CHAMPUS[e]	Yes	Yes	No	No	Yes	Yes
FEHBP[f]	7 plans	7 plans	6 plans	6 plans	20 plans	20 plans
Private insurance[g]	In some States	In some States	No	No	In some States	In some States

NA = not available

[a] Services that are typically and characteristically provided by physicians.

[b] During the publication of this case study, the Omnibus Reconciliation Act of 1986 (Public Law 99-509) was enacted. The act modifies Part B of Medicare and authorizes payment for (covers) services of physician assistants working under the supervision of physicians in hospitals, skilled nursing facilities, intermediate-care facilities, and as an assistant at surgery. The payment is indirect and at levels lower than physicians would receive for providing comparable services.

[c] Health maintenance organizations.

[d] State Medicaid programs have the option of including NP and PA services in their State Medicaid Plans. Congress mandated coverage of CNMs' services in 1980. As of January 1985, all States in which CNMs practiced either were complying with the law (Public Law 96-499) or were considering changes in their Medical plans to comply with the law.

[e] Civilian Health and Medical Program of the Uniformed Services.

[f] Federal Employees Health Benefit Program. FEHBP has 21 fee-for-service plans, some of which authorize payment to NPs, PAs, and CNMs.

[g] Whether State laws and regulations require or permit insurance coverage and direct payment for the services of NPs, PAs, and CNMs.

SOURCE: Office of Technology Assessment, 1986.

the kinds which are typically and characteristically rendered by physicians, e.g., prescribing medications, setting casts on fractures, assisting at surgery, and other activities that involve an independent evaluation or treatment of the patient's condition even if the attending physician is directly supervising these services (64).

The "incident to" provision was partly intended to reduce the possibility of physicians' making excessive profits by employing large numbers of assistants (162). The provision has been refined over time, and its complexity has led to varied interpretation by physicians. Strictly interpreted, the provision means that Medicare only pays for physicians' typical services when they are actually provided by physicians. Knowingly or unknowingly, however, some physicians bill for services irrespective of who performs the service. Unless audits are performed, Medicare contractors have difficulty determining who has rendered services from the Medicare billing form. One of the "incident to" provision's effects has been to sharply limit the administratively independent practice of NPs who cannot bill Medicare for medical services.

This provision was modified in 1980 (248) to permit generally supervised nurses and other paramedical personnel—such as NPs and PAs—to provide certain services to the homebound in some medically underserved areas. The "incident to" provision is waived only in areas that do not have certified home-health agencies. In 1984, there were 5,247 Medicare certified home-health agencies (164), and the number is growing (115). Presumably, therefore, NPs and PAs provide services to homebound patients only to a limited extent and only in areas where home-health agencies do not find it economical to function.

The Tax Equity and Fiscal Responsibility Act of 1982 (Public Law 97-248) allows for Medicare coverage of NPs' and PAs' services in HMOs and competitive medical plans (CMPs) that have entered into certain contractual risk-sharing arrangements with HCFA.[2] The implementing regulations permit NPs and PAs in HMOs and CMPs to furnish services without the direct personal supervision of physicians.[3] The NPs and PAs essentially can provide whatever services State law authorizes, including supervising or ordering services and supplies incidental to the services.

During the publication of this case study, the Omnibus Reconciliation Act of 1986 (Public Law 99-509) was enacted. The act modifies Medicare and authorizes payment for (covers) services of PAs working under the supervision of physicians in hospitals, skilled nursing facilities, intermediate-care facilities, and as an assistant at surgery. The payment is indirect and at levels lower than physicians would receive for providing comparable services.

---

[2] Calculations of capitation rates do not include NPs' or PAs' salaries but are determined by the average adjusted per capita costs which are based on the costs of past services received by beneficiaries who fall into particular sets governed by such factors as geographic location, age, sex, and eligibility.

[3] *Federal Register*, vol. 50, No. 7, Thursday Jan. 10, 1985, p. 1351.

Medicare's payment for inpatient hospital services under Part A does not specify coverage or payment for NPs' and PAs' services, either under Medicare's former cost-based reimbursement method or the current prospective-payment system. Hospitals usually pay for NPs' and PAs' services by salaries; the salaries and other costs of employing or contracting with NPs and PAs are included in the hospitals' formulas for calculating operating costs. Under cost-based reimbursement, Medicare pays the hospital the total operating costs associated with Medicare beneficiaries. Under the prospective-payment system, Medicare pays a fixed amount for each patient admitted; the aggregated amount is intended to cover the hospitals' total operating costs for Medicare beneficiaries.

Medicaid.—Under Medicaid, each State has considerable discretion to design its program within broad Federal guidelines. Covering and paying for the services provided by NPs and PAs is one of the benefits a State may choose to include in its Medicaid Plan. Data on the number of State Medicaid programs that cover NPs' services are not collected by HCFA's central office. Although the available data conflict, they indicate that State Medicaid programs are cautious about extending payment to NPs. A 1985 study noted that NPs were authorized to receive direct payment or indirect payment—i.e., to bill directly or through physicians—in 21 State Medicaid programs (60). An earlier study found that of the 26 State Medicaid programs that covered NPs' services, most paid indirectly. Nineteen of the twenty-six States adopted the Medicare approach of allowing payment only for NPs' services that were incidental to physicians' services (22).

A preliminary survey of State Medicaid programs found that 26 of the 36 State Medicaid programs covered PAs' services (5). Of those 26 programs, 18 reimbursed for PAs' services at the same rates as physicians', 4 reimbursed at lower rates, 2 reimbursed on a cost basis, and the remainder did not respond to the question. Most of the State Medicaid programs' requirements for supervision by physicians were similar to the requirements contained in State laws governing PAs' practice. (In most States, the scope of PAs' practice is controlled under medical-practice acts and regulations.) Other State Medicaid programs require that physicians review patients' charts every 7 days, that physicians be onsite, or that physicians be present. The scope of services covered for PAs also varied from the general (e.g., all the services cited in the PA law governing scope of services) to the specific (e.g., examinations under the program Early and Periodic Screening, Diagnosis, and Treatment; services in community health centers; and services in family planning agencies). Three States specified that only "incident to" services (i.e., services not traditionally performed by physicians) were covered for payment (25).

Medicaid payment for inpatient hospital services differs by State. Although 41 State Medicaid programs paid for hospital inpatient services on a retrospective cost basis at the beginning of 1980, 34 State Medicaid programs had some form of prospective-payment system as of December 1985 (133). Each State Medicaid program pays for operating costs—including salaries and other costs associated with NPs and PAs—according to its unique payment method for inpatient services (40).

Rural Health Clinics.—Access to primary-care services by NPs and PAs in satellite settings in isolated areas was hindered by the fact that payment for such services was available under Medicare and Medicaid only if a physician was on the premises when the services were delivered. The Rural Health Clinic Services Act of 1977 (Public Law 95-210) waived such restrictions for NPs and PAs practicing in certified rural health clinics located in designated underserved areas. The act permits payment for the services of NPs and PAs even when they are not directly surpervised by physicians at all times. This allows rural clinics staffed only by NPs and PAs backed up by physicians to provide reimbursable primary care typically provided by physicians, so long as written plans of treatment are periodically reviewed and approved by physicians. Payment, which is based on reasonable costs, is made to the employing clinic, not to the NP or PA, and is restricted to services that State legislation authorizes NPs and PAs to perform.

Nursing Homes.—Various Medicare and Medicaid regulations, in addition to coverage and payment provisions, limit the provision of certain services by PAs and NPs in nursing homes. In some States, the laws permit physicians to delegate such services to NPs and PAs.

Only physicians can provide certain services if a facility is to:

1. be certified as a skilled nursing facility (SNF) in the Medicare and Medicaid programs (42 CFR 405.1123,1124,1125,1126, and 1128);
2. be certified as an intermediate-care facility (ICF) in the Medicaid program (42 CFR 311, 334, 343, and 346);
3. obtain certification and recertification of a patient's need for care in an SNF in the Medicare program (42 CFR 456.260, 270, and 280); or

4. obtain certification of a patient's need for care in an SNF and ICF in the Medicaid program (42 CFR 456.360, and 380).

The specific services that must be performed by physicians vary according to the type of certification and the program. Under the Medicare and Medicaid programs, for example, patients can be admitted to SNFs based only on physicans' medical findings, diagnosis, and orders. Patients' care must be supervised by physicians, and patients must be seen by physicians at least every 30 days for the first 90 days after admission. Only physicians can prescribe drugs and order diagnostic and specialized rehabilitative services and therapeutic diets.

Unlike Medicare, Medicaid allows NPs and PAs to recertify patients' needs for institutional care. NPs and PAs are authorized to recertify the necessity of continuing medical care in SNFs (42 CFR 456.260) and ICFs (42 CFR 456.360) where general supervision is provided by physicians.

Civilian Health and Medical Program of the Uniformed Services.—The Federal Government, through the Department of Defense's CHAMPUS, has taken the lead in treating NPs as autonomous and independent providers of care for payment purposes. CHAMPUS began billing and paying for NPs' services on an experimental basis in fiscal year 1980. When the experiment ended 2 years later, CHAMPUS continued coverage and direct fee-for-service payment of NPs, thereby recognizing them as a distinct group of providers deserving direct compensation for services (60). Although CHAMPUS does not cover PAs' services, PAs are not seeking coverage under CHAMPUS, because DOD has indicated that CHAMPUS will begin contracting out its services and cease paying on a fee-for-service basis (83).

Federal Employees Health Benefit Program.—Like CHAMPUS, FEHBP experimented with direct payment and required that all FEHBP plans directly pay health practitioners, including NPs and PAs, who were licensed under applicable State law in those States where at least 25 percent of the population was located in formally designated primary-medical-care manpower -shortage areas (60). After the experimental period of January 1980 to December 1984, FEHBP did not require plans to compensate NPs and PAs directly.

Payment to providers of covered services currently depends on the terms of the FEHBP's contract with each health-benefit plan and thus varies among the plans. There is no statutory requirement that all plans offer payment to NPs and PAs, but some plans currently authorize NPs and PAs to receive direct payment or reimbursement for covered services without referral or supervision (see table B-1). Of the 21 fee-for-service plans participating in FEHBP for the contract year 1986, 7 cover and offer direct payment for services of NPs and 6 cover and offer direct payment for the services of PAs[4] (256). Only 14 percent of enrollees in FEHBP are enrolled in plans that cover NPs' services and 11 percent of enrollees in FEHBP are enrolled in plans that that cover PAs' services. Direct payment for NPs and other providers is now under consideration by Congress.[5]

Private Insurance

Private third-party payment for NPs' and PAs' services is subject to State laws and health insurance regulations. Increasing numbers of States have passed laws and regulations concerning payment for the services of NPs and PAs. Such laws and regulations must accord with the States' requirements governing the scope of practice of these providers and, in some cases, of physicians.

The State payment laws vary in a number of dimensions, including the types of insurers affected (for-profit, nonprofit, or both) and the types of insurance policy (22). Some laws affect the services of all nurses; others affect only special groups of nurses, such as NPs. Some States require insurers to include nurses' services as a reimbursable benefit (mandatory benefit), whereas other States require insurers to offer reimbursement for nurses' services as an option in their policies (mandatory option) (232).

---

[4] The numbers do not include the more than 300 prepaid comprehensive medical plans in the FEHBP, because the organization of medical delivery systems under these plans makes the issues of direct access, payment, supervision, and referral largely irrelevant.

[5] In early 1986, President Reagan vetoed H.R. 3384 which contained a provision requiring direct reimbursements to nurses and nurse-midwives who provide services to employees covered by the FEHBP. Congress then passed new legislation, Public Law 99-251, directing the Office of Personnel Management (OPM) to study and report to Congress on the advisability of amending the law governing FEHBP to provide mandatory recognition of additional health-care practitioners, such as nurse-midwives, nurse practitioners, chiropractors, and clinical social workers. The legislation extended direct reimbursement for nonphysician providers in medically underserved areas, which are determined by the Department of Health and Human Services to have at least 25 percent of the population living in areas with inadequate numbers of medical providers. OPM's study advised against mandatory coverage on grounds specific to FEHBP (e.g., mandating coverage would not increase the choice of practitioners available to plan members, nor would it necessarily increase competition among the plans). Nonetheless, the Subcommittee on Compensation and Employee Benefits of the House Committee on Post Office and Civil Service remains interested in the topic. The subcommittee held hearings on direct reimbursement for nonphysicians on Apr. 15, 1986, and indicated its intention to continue studying the issue. H.R. 4825, introduced on May 14, 1986, would authorize direct payment for services performed by NPs and CNMs and other health-care providers. As of June 1986, the bill had been reported favorably by the House Committee on Post Office and Civil Service and was awaiting floor action. The bill did not pass the 99th Congress.

Although direct third-party payment is the exception rather than the rule, 13 States currently permit direct payment for NPs' services (24). The wide variation in conditions for payment of NPs' services is apparent in the laws of Mississippi, Maryland, and Oregon regarding supervision by physicians. In all three States, insurers must pay for any service that is within NPs' lawful scope of practice, but Mississippi requires the NPs to work under the supervision of physicians, whereas Maryland prohibits direct payment to NPs who work under the direct supervision of physicians (101). In Oregon, supervision by physicians is not a condition for reimbursement (21).

No State laws mandate coverage of PAs' services. Except in Wisconsin, State laws are silent even about optional coverage of PAs' services (83). None of the States mandate direct reimbursement for PAs' services; indeed, 16 States explicitly prohibit it. Although there is anecdotal information concerning third-party payers who cover PAs' services, sometimes under physicians' billing, information concerning the extent of coverage is not available.

Businesses in the United States are beginning to provide insurance that pays directly for NPs and PAs (as well as CNMs). The Washington Business Group on Health recently conducted a national survey of its member organizations, all of which are large firms. Of the approximately 200 respondents, 43 percent are paying directly for the services of NPs, and 39 percent are doing so for PAs (91). The proportion of member companies reimbursing NPs and PAs (and CNMs) has increased steadily over the past decade (91).

In many States, NPs' and PAs' services still must be "incident to" physicians' services, for payment purposes, and compensation for NPs' and PAs' services must be made to their employing physicians or organizations. Nevertheless, the recent changes in some States' laws and in the policies of major corporations suggest a movement away from requirements for direct supervision by physicians. Increasingly, NPs and PAs can function administratively independently of physicians and qualify for direct payment. Also, more States are likely to pass legislation providing for the direct compensation of NPs and PAs.

Certified Nurse-Midwives

Government-Sponsored Programs

Medicare and Medicaid.—Medicare's policies concerning payment are the same for the services of CNMs as for the services of NPs and PAs. Medicaid's payment policies are much more permisssive for CNMs' services than for NPs' and PAs' services. In 1980, Congress enacted legislation (Public Law 96-499) to require that CNMs' services be a mandatory benefit under Medicaid. The Federal statute recognizes CNMs' autonomous practice expressly stating that the mandated benefit shall be provided "whether or not he is under the supervision of, or associated with, a physician or other health care provider" (60). HCFA issued the regulations that implemented this law in May 1982. As of January 1985, all States in which CNMs practiced either were complying with the statute and the regulations or were considering changing their Medicaid plans to bring them into compliance. Currently only four States and the District of Columbia do not provide for direct Medicaid payment to CNMs, and HCFA's regional offices are working with these jurisdictions to bring them into compliance (235). Furthermore, the Medicaid statute was amended by Public Law 98-369 to ensure that birthing centers operated by CNMs need not be administered by physicians to be eligible for coverage as Medicaid clinic services.

Rural Health Clinics.—CNMs are treated differently from NPs and PAs under the Rural Health Clinics Act. Only rural clinics employing NPs or PAs are eligible for certification under the act (Title 42, Section 481.4). Once a clinic is certified, however, it can receive payment for the services of the CNMs it employs.

Civilian Health and Medical Program of the Uniformed Services.—CHAMPUS singled out CNMs for special consideration before it experimented with direct payment for NPs' services starting in 1980. The Defense Appropriations Act of 1979 (Public Law 95-457) was the first Federal law to pay directly for services provided by CNMs without either referrals or direct supervision by physicians.

Federal Employees Health Benefit Program.—Of the 21 FEHBP fee-for-service plans, 20 cover CNMs without a contractual requirement for physicians' referrals or supervision. In addition, many prepaid plans in the FEHBP employ CNMs. Roughly 90 percent of all Federal enrollees are in plans that cover CNMs (256). Many of the insurance companies in the FEHBP offer the same coverage of CNMs for their private sector business.

Private Insurance

Private third-party payment for CNMs' services has also been mandated in a growing number of jurisdictions. As of 1983, 14 States had mandated direct reimbursement by private insurers for CNMs' care (55). By April 1986, the number of States had increased to 17 (11). In most States, direct supervision by physicians is not a condition of reimbursement (22). In addition, "in many other States insurers voluntarily have chosen to pay for nurse-midwifery care" (55). Fifty-seven percent of the large corporations surveyed by the Washington Business Group on Health provide direct reimbursement to CNMs (91).

References

References

1. Aday, L.A., and Andersen, R., *Development of Indices of Access to Medical Care* (Ann Arbor, MI: Health Administration Press, 1975).
2. Alexander, J.A., Lewis, B.L., and Morrisey, M.A., "Acquisition Strategies of Multihospital Systems," *Health Affairs* 4(3):49-66, fall 1985.
3. Allied Health Education Directory, 13th ed. (Washington, DC: American Medical Association, 1985).
4. Alsofrom, J., "Number of Group Practices Rising in U.S.," *American Medical News* 27(45):19, Dec. 7, 1984.
5. American Academy of Physician Assistants, "Survey of Chapters," Arlington, VA, unpublished document, September 1984.
6. American Academy of Physician Assistants, *1984 Physician Assistant Masterfile Survey* (Arlington, VA: 1984).
7. American Academy of Physician Assistants, Hearings Before the Subcommittee on Health, Senate Committee on Finance, U.S. Congress, Washington, DC, Apr. 25, 1986.
8. American Academy of Physician Assistants, "AAPA Membership Statistics by Graduation Date," Arlington, VA, May 13, 1986.
9. American College of Nurse-Midwives, *Nurse-Midwifery in the United States: 1976-1977* (Washington, DC: 1978).
10. American College of Nurse-Midwives, *Nurse-Midwifery in the United States: 1982* (Washington, DC: 1984).
11. American College of Nurse-Midwives, "Federal Employees Health Benefits Program," Hearings Before the Subcommittee on Compensation and Employee Benefits, House Committee on Post Office and Civil Service, U.S. Congress, Washington, DC, Apr. 15, 1986.
12. American College of Nurse-Midwives, Washington, DC, personal communication, Aug. 20, 1986.
13. American College of Nurse-Midwives and American College of Obstetricians and Gynecologists, "Joint Statement of Practice Relationships Between Obstetricians/Gynecologists and Certified Nurse-Midwives," unpublished mimeo, Washington, DC, Nov. 1, 1982.
14. American Hospital Association, *Directory of Multihospital Systems* (Chicago, IL: American Hospital Publishing, Inc., 1985).
15. American Medical Association, Center for Health Policy Research, *SMS Reports* 2(3), June 1983.
16. American Medical Association, Center for Health Policy Research, *SMS Reports* 2(7), November 1983.
17. American Medical Association, Center for Health Policy Research, *Socioeconomic Characteristics of Medical Practice 1983*, R.A. Reynolds and J.B. Abram (eds.) (Chicago, IL: 1983).
18. American Medical Association, Center for Health Policy Research, *Socioeconomic Characteristics of Medical Practice* (Chicago, IL: 1984).
19. American Medical Association, Center for Health Policy Research, *SMS Reports* 3(8), November 1984.
20. American Medical Association, Center for Health Policy Research, *Socioeconomic Characteristics of Medical Practice* (Chicago, IL: 1985).
21. American Nurses Association, *Nurse Practitioners: A Review of the Literature* (Kansas City, MO: 1983).
22. American Nurses Association, *Third-Party Reimbursement for Services of Nurses* (Kansas City, MO: 1983).
23. American Nurses Association, *Obtaining Third-Party Reimbursement: A Nurse's Guide to Methods and Strategies* (Kansas City, MO: 1984).
24. American Nurses Association, Washington, DC, personal communication, June 1986.
25. Association of Physician Assistant Programs/American Academy of Physician Assistants, *National Physician Assistant Survey* (Arlington, VA: May 1982).
26. Atherton, R.A., and LeGendre, S.T., "A Description of Nurse Practitioners' Practice in Occupational Health Settings," *Occupational Health Nursing* 33(1):18-20, January 1985.
27. Bailet, H., Lewis, J., Hochheiser, L., et al., "Assessing the Quality of Care," *Nurs. Outlook* 23(3):153-159, March 1975.
28. Barer, M.L., Evans, R.G., and Labelle, R., "The Frozen North: Controlling Physicians Costs Through Controlling Fees," prepared for the Office of Technology Assessment, U.S. Congress, Washington, DC, November 1985.
29. Batey, M.V., and Holland, J.M., "Prescribing Practices Among Nurse Practitioners in Adult and Family Health," *Am. J. Public Health* 75(3):258-262, March 1985.
30. Becker, D.M., Fournier, A.M., and Gardner, L.B., "A Description of a Means of Improving Ambulatory Care in a Large Municipal Teaching Hospital: A New Role for Nurse Practi-

tioners," *Med. Care* 20(10): 1046-1050, October 1982.

31. Bellet, P.S., and Leeper, J.D., "Effectiveness of the Pediatric Nurse Practitioner Well-Baby Clinics in West Alabama," *Ala. J. Med. Sci.* 19(2):126-128, April 1982.
32. Bennett, S., and Biener, L., *Executive Summary: Determinants of Effectiveness of Physician-Nurse Practitioner Teams*, Grant No. 1 RO1 HSO 4104 (Washington, DC: National Center for Health Services Research, March 1983).
33. Bennetts, A.B., and Ernest, E.M., "Freestanding Birth Centers," *Research Issues in the Assessment of Birth Settings*, Pub. No. (IOM) 82-04 (Washington, DC: National Academy Press, 1982).
34. Bibb, B.N., "Comparing Nurse-Practitioners and Physicians: A Simulation Study on Processes of Care," *Eval. & Health Prof.* 5(1):29-42, March 1982.
35. Breslau, N., "The Role of the Nurse-Practitioner in a Pediatric Team: Patient Definitions," *Med. Care* 15(12):1014-1023, December 1977.
36. Brooks, E.F., "Nurse Practitioners' Changing Impact on Health Care," presented at the 12th Annual Regional Conference on Maternal and Child Health, Family Planning, and Crippled Childrens' Services, Chapel Hill, NC, Apr. 23, 1985.
37. Brooks, E.F., Bernstein, J.D., DeFriese, G.H., et al., "New Health Practitioners in Rural Satellite Health Centers: The Past and Future," *J. Community Health* 6(4):246-256, summer 1981.
38. Brooks, E.F., and Johnson, S., "Nurse Practitioner and Physician Assistant Rural Satellite Health Centers: The Pending Demise of an Organizational Form?" *Med. Care* 24(10):881-890, October 1986.
39. Brooks, E.F., and Whitsel, J.R., "Recent Changes in the Supply and Distribution of Physicians in North Carolina," *N.C. Med. J.* 44(8):477-480, August 1983.
40. Brown, C., Division of Alternate Reimbursement Systems, Health Care Financing Administration, U.S. Department of Health and Human Services, Baltimore, MD, personal communication, Apr. 30, 1986.
41. Brown, J.D., Brown, M.I., and Jones, F., "Evaluation of a Nurse Practitioner-Staffed Preventive Medicine Program in a Fee-for-Service Multispecialty Clinic," *Prev. Med.* 8(1):53-64, January 1979.
42. Brucker, M.C., and Muellner, M., "Nurse-Midwifery Care of Adolescents," *J. Nurse-Midwifery* 30(5):277-279, September/October 1985.
43. Burosh, P., "Physicians' Attitudes Towards Nurse-Midwives," *Nurs. Outlook* 23: 453-456, July 1975.
44. Butler, C., "The 1983 NAPNAP Membership Survey," *Ped. Nurs.* 10(3):187-190, May/June 1984.
45. Carter, R.D., Perry, H.B., and Oliver, D., "Secondary Analysis: 1981 National Survey of Physician Assistants," final report to the National Center for Health Services Research, Public Health Service, U.S. Department of Health and Human Services, Washington, DC, June 25, 1984.
46. Caserta, J.E., and Addiss, S., "Economics of Community Health: Dealing With Realities," American Academy of Nursing, American Nurses' Association, 1985.
47. Caward, J.F., "Economics of the N.P. Role in an Industrial Setting," *Nurse Pract.* 6(6):17, November/December 1981.
48. Cawley, J.F., "Health Policy Issues Facing PAs," *Physician Assistant* 9(2):133-162, February 1985.
49. Cawley, J.F., "The Physician Assistant Profession: Current Status and Future Trends," *J. Public Health Policy* 6(1):78-99, March 1985.
50. Chambers, L.W., Bruce-Lockhart, P., Black, D.P., et al., "A Controlled Trial of the Impact of the Family Practice Nurse on Volume, Quality, and Cost of Rural Health Services," *Med. Care* 15(12):971-981, September 1977.
51. Chambers, L.W., Burke, M., Ross, J., et al., "Quantitative Assessment of the Quality of Medical Care Provided in Five Family Practices Before and After Attachment of a Family Practice Nurse," *J. Can. Med. Assoc.* 118:1060-1064, May 6, 1978.
52. Charney, E., and Kitzman, H., "The Child Health Nurse (Pediatric Nurse Practitioner) in Private Practice: A Controlled Trial," *N. Engl. J. Med.* 285(24):1353-1358, Dec. 9, 1971.
53. Cherry, J., and Foster, J.C., "Comparison of Hospital Charges Generated by Certified Nurse-Midwives' and Physicians' Clients," *J. Nurse-Midwifery* 27(1):7-11, January/February 1982.
54. Cohn, S.D., "Introduction," *J. Nurse-Midwifery* 29(5):57-62, September/October 1984.
55. Cohn, S.D., "The Nurse-Midwife: Malpractice and Risk Management," *J. Nurse-Midwifery* 29(5):316-321, September/October 1984.
56. Comptroller General of the United States, Report to the Congress, *Progress and Problems in Training and Use of Assistants to Primary Care Physicians*, Department of Health, Education, and Welfare, Washington, DC, Apr. 8, 1975.
57. Crandall, L.A., Santulli, W.P., Radelet, M.L.,

et al., "Physician Assistants in Primary Care: Patient Assignment and Task Delegation," *Med. Care* 22(3):268-282, March 1984.

58. Crowley, A.E., Etzel, S.I., and Petersen, E.S., "Undergraduate Medical Education," *J.A.M.A.* 252(12):1525-1532, Sept. 24, 1984.
59. Davis, L., and Katz, B.M., "Knowledge and Attitude Toward Nurse-Midwifery Taking Childbirth Education Classes," *J. Nurse-Midwifery* 24:18-26, July/August 1979.
60. DeLeon, P.H., Kjervik, D.K., Kraut, A.G., et al., "Psychology and Nursing: A Natural Alliance," *Am. Psychol.* 40(11):1153-1164, November 1985.
61. Denton, F.T., Gafni, A., Spencer, B.G., et al., "Potential Savings From the Adoption of Nurse Practitioner Technology in the Canadian Health Care System," *Socio-Econ. Plan. Sci.* 17(4):199-209, 1983.
62. Dentzler, S. and Tsuroka, D., "Malpractice Insurers Are Ill," *Newsweek* 105:58, Apr. 29, 1985.
63. Desmairais, H.R., Acting Administrator, Office of the Administrator, Health Care Financing Administration, U.S. Department of Health and Human Services, Washington, DC, *Medicare Reimbursement for Physician Services*, Hearings Before the Subcommittee on Health, House Committee on Ways and Means, U.S. Congress, Apr. 14, 1986.
64. Desmairais, H.R., Acting Administrator, Office of the Administrator, Health Care Financing Administration, U.S. Department of Health and Human Services, Washington, DC, personal communication to The Honorable Robert W. Kasten, April 1986.
65. Dickstein, D., "Evaluation of the Group Health Cooperative Demonstration Midwifery Service," report to The Henry J. Kaiser Family Foundation, Menlo Park, CA, 1983.
66. Diers, D., "Future of Nurse-Midwives in American Health Care," *Nursing in the 1980's: Crises, Opportunities, and Challenges*, L.H. Aiken and S.R. Gortner (eds.) (Philadelphia, PA: J.B. Lippincott, 1982).
67. Diers, D., and Burst, H.V., "Effectiveness of Policy Related Research: Nurse-Midwifery as a Case Study," *Image: The Journal of Nursing Scholarship* 15(3):68-74, summer 1983.
68. Diggs, W.W., "Rural Distribution of Physicians in Tennessee," *J. Tenn. Med. Assoc.* 76(2):79-85, February 1983.
69. DiGirol, M.T., and Parry, W.H., "Consultation to the Pediatric Automated Military Outpatient Systems Specialist (AMOSIST): A Comparison of Consultation by a Pediatric Clinical Nurse Specialist and by a Pediatrician," *Milit. Med.* 148(4): 364-367, April 1983.
70. Donabedian, A., *Explorations in Quality Assessment and Monitoring, Volume I: The Definition of Quality and Approaches to Its Assessment* (Ann Arbor, MI: Health Administration Press, 1980).
71. Draye, M.A., and Stetson, L.A., "The Nurse Practitioner as an Economic Reality," *Nurse Pract.* 1(2):60-63, November/December 1975.
72. Duncan B., Smith, A.N., and Silver, H.K., "Comparison of the Physical Assessment of Children by Pediatric Nurse Practitioners and Pediatricians," *Am. J. Public Health* 60(6):1170-1176, June 1971.
73. Duttera, M.J., and Harlan, W.R., "Evaluation of Physician Assistants in Rural Primary Care," *Arch. Intern. Med.* 138(2):224-228, February 1978.
74. Eastaugh, S.R., "An Efficient Solution to Primary Care Maldistribution," *Hosp. Progress* 62(2):32-35, February 1981.
75. Ebersole, P., Smith, A., Dickey, E.W., et al., "Roles and Functions of Geriatric Nurse Practitioners in Long Term Care as Viewed by Physician, GNP and Administrator," *American Health Care Association Journal* 8(2):2-7, March 1982.
76. Ebersole, P., "Gerontological Nurse Practitioners Past and Present," *Geriatric Nursing*, 219-222, July/August 1985.
77. Eggert, J., "Direct Assessment vs. Brokerage: A Comparison of Case Management Models," Monroe County Long-Term Care Program, Rochester, NY, Mar. 28, 1986.
78. Ehrnman, K., Government Relations Coordinator, American College of Nurse-Midwives, Washington, DC, personal communication, May 28, 1985.
79. Ehrnman, K., Government Relations Coordinator, American College of Nurse-Midwives, Washington, DC, personal communication, Oct. 20, 1986.
80. Enggist, R.E., and Hatcher, M.E., "Factors Influencing Consumer Receptivity to the Nurse Practitioner," *J. Med. Syst.* 7(6):495-512, December 1983.
81. Feldbaum, E.G., "Will Nurses Alleviate Health Service Maldistribution Problems?" *Nursing Administration Quarterly* 4(1):61-66, fall 1979.
82. Feldman, R., Taller, S.L., Garfield, S.R., et al., "Nurse Practitioner Multiphasic Health Checkups," *Prev. Med.* 6(3):391-403, September 1977.
83. Finefrock, Williams, American Academy of Physician Assistants, Arlington, VA, personal communication, May 6, 1986.
84. Flynn, B.C., "The Effectiveness of Nurse Clinicians' Service Delivery," *Am. J. Public Health* 64(6):604-611, June 1974.

85. Freedman, S.A., "Megacorporate Health Care: A Choice for the Future," *N. Engl. J. Med.* 312(9):579-582, Feb. 28, 1985.
86. Gairola, G.A., "Physician Assistant Graduates: Factors Related to Rural-Urban Practice Location," *J. Community Health* 8(1):23-32, fall 1982.
87. Gambert, S.R., Rosenkrantz, W.E., Basu, S.N., et al., "Role of the Physician-Extender in the Long-Term Care Setting," *Wis. Med. J.* 82(9):30-32, September 1983.
88. Garfield, S.R., Collen, M.F., Feldman, R., et al., "Evaluation of an Ambulatory Medical Care-Delivery System," *N. Engl. J. Med.* 294:(8) 426-431, Feb. 19, 1976.
89. Gelot, D., Division of Nursing, Bureau of Health Professions, Health Resources and Services Administration, Public Health Service, U.S. Department of Health and Human Services, Rockville, MD, personal communication, Aug. 20, 1986.
90. Gladhart, S.C., Crespo, M., and Anderson, V., "The Physician Assistant in Kansas," *J. Kans. Med. Soc.* 79:20, 1978.
91. Goldbeck, W.B., President, Washington Business Group on Health, Washington, DC, personal communication, Apr. 18, 1985.
92. Goldberg, G.A., Jolly, O.M., Hosek, S., et al., "Physician's Extenders' Performance in Air Force Clinics," *Med. Care* 19(9):951-965, September 1981.
93. Golden, A.S., and Cawley, J.F., "A National Survey of Performance Objectives of Physician's Assistant Training Programs," *J. Med. Educ.* 58(5):418-424, May 1983.
94. Graduate Medical Education National Advisory Committee, U.S. Department of Health and Human Services, *GMENAC Summary Report to the Secretary* (Washington, DC: 1980).
95. Gray, B., Project Director, Institute of Medicine, National Academy of Sciences, Washington, DC, personal communication, May 1986.
96. Greaney, F.J., "Opportunities for Nurses in Utilization Review," *Nursing Economics* 4(5):245-246, 257, September/October 1986.
97. Greene, S., Senior Director, Health Economics Research, Blue Cross/Blue Shield of North Carolina, Durham, NC, personal communication, Apr. 2, 1985.
98. Griffith, H.M., "Strategies for Direct Third-Party Reimbursement for Nurses," *Am. J. Nurs.* 82(3): 408-411, March 1982.
99. Griffith, H.M., "A Case Study of the Implementation of Legislation Providing Direct Third Party Reimbursement for Services of Nurse Practitioners in Maryland," unpublished doctoral dissertation, 1984.
100. Griffith, H.M., "Who Will Become the Preferred Providers?" *Am. J. Nurs.* 85(5):538-542, May 1985.
101. Griffith, H.M., Consultant, Lecturer, Researcher on Health Policy and Nursing Economics, Fort Hood, TX, personal communication, July 15, 1986.
102. Griffith, H.M., "Direct Third-Party Reimbursement for Nursing Services," *Nursing Economics* (forthcoming).
103. Harsham, P., "Midwifery: The Latest Growth Industry," *Soc. Sci. Med. [c]* 60(10):232-245, May 16, 1983.
104. Hastings, G.E., Vick, L., Lee, G., et al., "Nurse Practitioners in a Jailhouse Clinic," *Med. Care* 18(7):731-744, July 1980.
105. Hausner, T., Lee, A.J., Venable, A., et al., "The Urban Health Clinics Demonstration: A Review of the Relevant Literature," working paper, Arthur D. Little, Inc., Cambridge, MA, May 1983.
106. Health Insurance Association of America, *Source Book of Health Insurance Data: 1982-83* (Washington, DC: no date).
107. Health Services Research Center, University of North Carolina at Chapel Hill, *The National Rural Primary Care Evaluation Project: Issue-Oriented Data Analysis*, final report to the Robert Wood Johnson Foundation (Chapel Hill, NC: April 1985).
108. Heiman, E.M., and Dempsey, M.K., "Independent Behavior of Nurse Practitioners: A Survey of Physician and Nurse Attitudes," *Am. J. Public Health* 66(6):587-589, June 1976.
109. Henderson, M., "A GNP in a Retirement Community," *Geriatric Nursing* 5(2):109-112, March/April 1984.
110. Hershey, J.C., and Kropp, D.H., "A Re-Appraisal of the Productivity Potential and Economic Benefits of Physician's Assistants," *Med. Care* 27(6):592-606, June 1979.
111. Hershey, J.C., and Kropp, D.H., "Response to Ms. Major," *Med. Care* 28(6):687-689, June 1980.
112. Hicks, L.L., "Social Policy Implications of Physician Shortage Areas in Missouri," *Am. J. Public Health* 74(12):1316-1321, December 1984.
113. Hoekelman, R.A., Patterson, P.K., Bergman, A.B., et al., "Parent Reaction to the Concept of Pediatric Assistants," *Pediatrics* 44:69-75, July 1969.
114. Holmes, G.C., Livingston, G., Basset, R.E., et al., "Nurse Clinician Productivity Using a Relative Value Scale," *Health Serv. Res.* 12(3):269-283, fall 1977.
115. Hoyer, R., National Association for Home Care, Washington, DC, personal communication, May 16, 1986.
116. Huntington, C.G., General Partner, Hermon

Medical Group, Hermon, NY, personal communication, Apr. 9, 1985.

117. Huntington, C.G., General Partner, Hermon Medical Group, Hermon, NY, personal communication, May 12, 1986.

118. Institute for International Health Initiatives, *Directory of Preferred Provider Organizations and the Industry Report on PPO Development* (Bethesda, MD: American Medical Care and Review Association, June 1985).

119. Institute of Medicine, National Academy of Sciences, *Primary Care in Medicine: A Definition* (Washington, DC: National Academy Press, 1977).

120. Institute of Medicine, National Academy of Sciences, *Nursing and Nursing Education: Public Policies and Private Actions* (Washington, DC: National Academy Press, 1983).

121. Institute of Medicine, National Academy of Sciences, *Preventing Low Birthweight* (Washington, DC: National Academy Press, 1985).

122. Institute of Medicine, National Academy of Sciences, Committee on Nursing Home Regulation, *Improving the Quality of Care in Nursing Homes* (Washington, DC: National Academy Press, 1986).

123. Interstudy, Inc., *National HMO Census 1985* (Excelsior, MN: Interstudy, Inc., 1986).

124. Jean, G.L., Brovender, S.R., Freeland, R., et al., "Geriatric Nurse Practitioners Impact Long Term Care," presented at the XII International Congress of Gerontology, Hamburg, Germany, July 12-17, 1981.

125. Johnson, R.E., Freeborn, O.K., Lee, G., et al., "Delegation of Office Visits in Primary Care to PAs and NPs: The Physicians' View," *Physician Assistant* 9(1):159-169, January 1985.

126. Kane, R.L., *Geriatrics in the United States* (Lexington, MA: D.C. Heath & Co., 1981).

127. Kane, R.L., Gardner, J., Wright, D.D., et al., "Differences in the Outcomes of Acute Episodes of Care Provided by Various Types of Family Practitioners," *J. Fam. Prac.* 6(1):133-138, June 1978.

128. Kane, R.L., Jorgensen, L.A., Teteberg, B., et al., "Is Good Nursing Home Care Feasible?" *J.A.M.A.* 235(5):516-519, Feb. 2, 1976.

129. Kane, R.L., Olsen, D.M., and Castle, C.H., "Medex and Their Physician Preceptors: Quality of Care," *J.A.M.A.* 236(22):2509-2512, Nov. 28, 1976.

130. Komaroff, A.L., Sawayer, K., Flatley, M., et al., "Nurse Practitioner Management of Common Respiratory and Genitourinary Infections, Using Protocols," *Nurs. Res.* 25(2):84-89, March/April 1976.

131. Kubala, S., and Clever, L.H., "Acceptance of the Nurse Practitioner," *Am. J. Nursing* 74(3):451-452, March 1974.

132. LaBar, C., *Third-Party Reimbursement Legislation for Services of Nurses: A Report of Changes in State Health Insurance Laws* (Kansas City, MO: American Nurses' Association, 1984).

133. Laudicina, S.S., "A Comparative Survey of Medicaid Hospital Reimbursement Systems for Inpatient Services, State by State, 1980-1985," Intergovernmental Heal Project, George Washington University, Washington, DC, 1985.

134. Lawrence, R.S., DeFriese, G.H., Putnam, S.M., et al., "Physician Receptivity to Nurse Practitioners: A Study of the Correlates of Delegation of Clinical Responsibility," *Med. Care* 15(4):298-310, April 1977.

135. Lazarus, W., Levine, E.S., Lewin, L.S., et al., *Competition Among Health Practitioners: The Influence of the Medical Profession on the Health Manpower Market, Volume II: The Childbearing Center Case Study*, report prepared for the Federal Trade Commission (Washington, DC: Federal Trade Commission, February 1981).

136. Legislative Network for Nurses, "AMA Resolves to Fight Expanding Practices of Nurses," *Legislative Network for Nurses* 2(17):1, Aug. 22, 1985.

137. Leiken, A.M., "Factors Affecting the Distribution of Physician Assistants in New York State: Policy Implications," *J. Public Health Policy* 6(2):236-243, June 1985.

138. LeRoy, L., and Solkowitz, S., *The Costs and Effectiveness of Nurse Practitioners* (Health Technology Case Study #16), prepared for the Office of Technology Assessment, U.S. Congress, OTA-HCS-16 (Washington, DC: U.S. Government Printing Office, August 1980).

139. Levine, D.M., Morlock, L.L., Mushlin, A.I., et al., "The Role of New Health Practitioners in a Prepaid Group Practice: Provider Differences in Process and Outcomes of Medical Care," *Med. Care* 14(4):326-347, April 1976.

140. Levy, B.S., Wilkinson, F.S, and Marine, W.M., "Reducing Neonatal Mortality Rates With Nurse Midwives," *Am. J. Obstet. Gynecol.* 109(1):50-58, Jan. 1, 1971.

141. Lewis, C.E., and Resnick, B.A., "Nurse Clinics and Progressive Ambulatory Patient Care," *N. Engl. J. Med.* 277(23):1236-1241, Dec. 7, 1967.

142. Lewis, C.E., Resnick, B.A., Schmidt, G., et al., "Activities, Events and Outcomes in Ambulatory Patient Care," *N. Engl. J. Med.* 280(12):645-649, Mar. 20, 1969.

143. Light, D.W., "Is Competition Bad?" *N. Engl. J. Med.* 309(21):1315-1318, Nov. 24, 1983.

144. Light, D.W., "The Impact of Competition on Physician Surplus: GMENAC Revisited," LDI policy discussion paper No. 4, Leonard Davis Institute of Health Economics, University of Pennsylvania, Philadelphia, PA, 1984.
145. Linn, L.S., "Patient Acceptance of the Family Nurse Practitioner," *Med. Care* 14(4):357-364, April 1976.
146. Lohr, K.N., and Brook, R.H., "Quality Assurance in Medicine," *Am. Behav. Scientist* 27(5): 583-607, May/June 1984.
147. Lohrenz, F., Payne, R., Intress, R., et al., "Placement of Primary Care Physicians Assistants in Small Rural Communities," *Wis. Med. J.* 75:593, 1976.
148. Lubic, R.W., "Evaluation of an Out-of-Hospital Maternity Center for Low Risk Patients," in *Health Policy and Nursing Practice*, L.H. Aiken (ed.) (New York, NY: McGraw-Hill Book Co., 1980).
149. Lubic, R.W., "Childbirthing Centers: Delivering More for Less," *Am. J. Nurs.* 83(7):1053-1056, July 1983.
150. Lubic, R.W., Director, Maternity Center Association, New York, NY, personal communication, June 9, 1986.
151. Lynaugh, J., Primary Care Family Nurse Clinical Program, University of Pennsylvania, Philadelphia, PA, personal communication, January 1986.
152. Magill, G., and Hartze, L., *Immediate Care Centers: Fast Medicine for the '80s*, DHHS Pub. No. HRP-0905987 (Washington, DC: U.S. Government Printing Office, November 1984).
153. Major, E.E., "A Comment on 'A Re-Appraisal of the Productivity Potential and Economic Benefits of Physician's Assistants,'" *Med. Care* 18(6):686-687, June 1980.
154. Manber, M.M., "NPs, MDs, and PAs: Meshing Their Changing Roles," *Med. World News* 26(18):53-71, Sept. 23, 1985.
155. Master, R.J., Feltin, M., Jainchill, J., et al., "A Continuum of Care for the Inner City: Assessment of Its Benefits for Boston's Elderly and High-Risk Populations," *N. Engl. J. Med.* 302(26):1434-1440, June 26, 1980.
156. McKaig, C., Hindi-Alexander, M., Myers, T.R., et al., "Implementation of the School Nurse Practitioner Role: Barriers and Facilitators," *J. of Occup. Safety & Health* 54(1):21-23, January 1984.
157. McDermott, S.M., Mountain States Health Corp., Boise, ID, personal communication, Apr. 25, 1986.
158. Meglan, M.C., "A Prototype of Health Services for the Quality of Life in a Rural County," *Bulletin of Nurse-Midwifery* 17(4):103-113, November 1972.
159. Mendenhall, R., and Repicky, P.A., *Collection and Processing of Baseline Data for the Physician Extender Reimbursement Study*, Pub. No. (HRA) 76-43 (Washington, DC: U.S. Government Printing Office, 1978).
160. Mendenhall, R.C., Repicky, P.A., and Neville, R.E., "Assessing the Utilization and Productivity of Nurse Practitioners and Physician's Assistants: Methodology and Findings on Productivity," *Med. Care* 18(6):609-623, June 1980.
161. Michels, K.A., Assistant Director, Congressional and Agency Relations, American Nurses' Association, Washington, DC, personal communication, June 17, 1986.
162. Miller, F.N., "Nurse Providers: A Resource for Growing Population Needs," *Business Health* 2(3):38-42, January/February 1985.
163. Miller, G., Vice President, Practice Development, Humana, Inc., Louisville, KY, personal communication, May 16, 1986.
164. Milstead, D., Health Care Financing Administration, U.S. Department of Health and Human Services, Baltimore, MD, personal communication, March 1985.
165. Mitchell, J., President, Health Economic Research, Inc., *Medicare Reimbursement for Physician Services*, Hearings Before the Subcommittee on Health, House Committee on Ways and Means, U.S. Congress, Apr. 14, 1986.
166. Mitchell, J.B., and Hewes, H., *Medicare Access to Physician Services in Nursing Homes*, final report prepared for the Health Care Financing Administration, U.S. Department of Health and Human Services, Baltimore, MD, Nov. 22, 1982.
167. Mitchell, K., "NAPNAP's Scope of Practice Survey: Results, Revisions, and Issues," *Ped. Nurs.* 9(3):199-203, May/June 1983.
168. Morgan, W.A., and Sullivan, N.D., "Nurse Practitioner and Physician's Assistant Clinics in Rural California, Part II: A Survey," *West. J. Med.* 132(3):259-264, March 1980.
169. Morris, S.B., and Smith, D.B., "The Distribution of Physician Extenders," *Med. Care* 15(12):1045-1057, December 1977.
170. Morrisey, M.A., Allen, J., and Shortell, S., "Medical Staff Size, Hospital Privileges and Compensation Arrangements," *For Profit Enterprises in Health Care*, Institute of Medicine, National Academy of Sciences (Washington, DC: National Academy Press, June 1986).
171. Morrisey, M.A., and Brooks, D.C., "The Ex-

panding Medical Staff: Nonphysician Providers," *Hospitals* 59(15):58-59, Aug. 1, 1985.

172. National Association for Ambulatory Care, "Annual Survey: Compensation Practices and Employee Benefits in Ambulatory Care Centers," prepared by Commerce International, Inc., Washington, DC, September 1985.
173. Nelson, E.C., Jacobs, A.R., and Johnson, K.G., "Patients' Acceptance of Physician's Assistants," *J.A.M.A.* 228(1):63-67, Apr. 1, 1974.
174. Newhouse, J.P., Williams, A.P., Bennett, B.W., et al., "Where Have All the Doctors Gone?" *J.A.M.A.* 247(17):2392-2396, May 7, 1982.
175. Ollivier, S., Lesser, C., and Bell, K.B., "Providing Infertility Care," *J. of Geriatric Nurs.* (Supplement) 13(2):85s-90s, March/April 1984.
176. Owens, A., "Doctor Surplus: Where Things Stand Now," *Soc. Sci. Med. [c]* 57(20):63-80, Sept. 29, 1980.
177. Penner, R.G., Director, Congressional Budget Office, U.S. Congress, Washington, DC, personal communication to The Honorable Ron Wyden, Nov. 5, 1984.
178. Perrin, E.C., and Goodman, H.C., "Telephone Management of Acute Pediatric Illnesses," *N. Engl. J. Med.* 298(3):130-135, Jan. 19, 1978.
179. Perry, H.B., "An Analysis of the Professional Performance of Physician's Assistants," *J. Med. Educ.* 52(8):639-647, August 1977.
180. Perry, H.B., "An Analysis of the Specialty and Geographic Location of Physician Assistants in the United States," *Am. J. Public Health* 68(10):1019-1021, October 1978.
181. Perry, H.B., "Role of the Nurse-Midwife in Contemporary Maternity Care," *Psychosomatic Obstetrics and Gynecology*, D.D. Youngs and A.A. Ernhardt (eds.) (New York: Appleton-Century-Crofts, 1980).
182. Perry, H.B., and Breitner, B., *Physician Assistants: Their Contribution to Health Care* (New York: Human Sciences Press, 1982).
183. Perry, H.B., and Redmond, E.L., *Deployment and Career Trends of Physician Assistants*, final report to the National Center for Health Services Research (Springfield, VA: National Technical Information Service, 1980).
184. Piechnik, S.L., and Corbett, M.A., "Reducing Low Birth Weight Among Socioeconomically High-Risk Adolescent Pregnancies," *J. of Nurse-Midwifery* 30(2):88-98, March/April 1985.
185. Pollard, M.R., Director, Office of Policy Analysis, Pharmaceutical Manufacturers Association, Washington, DC, personal communication, Apr. 2, 1985.
186. Powers, M.J., Jalowiec, A., and Reichelt, P.A., "Nurse Practitioner and Physician Care Compared for Nonurgent Emergency Room Patients," *Nurse Pract.* 9(2):39-52, February 1984.
187. Prescott, P.A., and Driscoll, L., "Evaluating Nurse Practitioner Performance," *Nurse Pract.* 5(4):28-32, July/August 1980.
188. Purdy, C.J., Merenstein, G.B., and Walls, M.J.I., "Retrospective Audit of the Pediatric Nurse Practitioner in the Normal Newborn Nursery," *Ped. Nurs.* 5(6):55-57, November/December 1979.
189. Ramsay, J.A., McKenzie, J.K., and Fish, D.G., "Physicians and Nurse Practitioners: Do They Provide Equivalent Health Care?" *Am. J. Public Health* 72(1):55-57, January 1982.
190. Record, J.C., and Cohen, H.R., "The Introduction of Midwifery in a Prepaid Group Practice," *Am. J. Public Health* 62(3):354-360, March 1972.
191. Record, J.C., and Greenlick, M., "New Health Professionals and the Physician Role: An Hypothesis From Kaiser Experience," *Public Health Reports* 90(3):241-246, June 1975.
192. Record, J.C., McCally, M.,,Schweitzer, S.O., et al., "New Health Professions After a Decade and a Half: Delegation, Productivity and Costs in Primary Care," *J. Health Polit. Policy Law* 5(3):470-497, fall 1980.
193. Reid, M.L., and Morris, J.B., "Perinatal Care and Cost-Effectiveness: Changes in Health Expenditures and Birth Outcome Following the Establishment of a Nurse-Midwife Program," *Med. Care* 17(5):491-500, May 1979.
194. Renn, S.C., Schramm, C.J., Watt, J.M., et al., "The Effects of Ownership and System Affiliation on the Economic Performance of Hospitals," *Inquiry* 22(3):219-236, fall 1985.
195. Richards, S.J., and DeCastro, F.J., "Communication With Patients: A Parameter in Evaluating Nurse Practitioners," *Mo. Med.* 70(10):719-720, October 1973.
196. Riessman, C.K., "The Use of Health Services by the Poor: Are There Any Promising Models?" *Social Policy* 14(4):30-40, spring 1984.
197. Robert Wood Johnson Foundation, *Updated Report on Access to Health Care for the American People: Special Report* (Princeton, NJ: 1983).
198. Rodeghero, J.A., "Perceptions of Nurse Practitioners Among the Rural Poor," *Nurse Pract.* 3(5):7, September/October 1978.
199. Romm, J., Berkowitz, A., Cahn, M.A., et al., "The Physician Extender Reimbursement Experiment," *J. Amb. Care Management* 2(2):1-12, May 1979.
200. Rooks, J.P., "President's Pen," *Quickening* 14(4):1-2, July/August 1983.
201. Rooks, J.P., President, American College of

Nurse-Midwives, Washington, DC, personal communication, June 5, 1986.

202. Rooks, J.P., "Cost-Effectiveness of Nurse-Midwifery Care," *Nurse-Midwifery in America*, J. Rooks and E. Hass (eds.) (Washington, DC: American College of Nurse-Midwives Foundation, 1986).

203. Rooks, J.P., and Fischman, S.H., "American Nurse-Midwifery in 1976-1977: Reflections of 50 Years of Growth and Development," *Am J. Public Health* 70(9):990-996, September 1980.

204. Rosenaur, J., Stanford, D., Morgan, W., et al., "Prescribing Behaviors of Primary Care Nurse Practitioners," *Am. J. Public Health* 74 (1):10-13, January 1984.

205. Rosenberg, C., "Nurse/Physician Relations: A Perspective From Medicine," *Bull. N.Y. Acad Med.* 60(8):807-810, October 1984.

206. Rossiter, L.F., "Prospects for Medical Group Practice Under Competition," *Med. Care* 22(1): 84-92, January 1984.

207. Ruby, G., "Consumer Acceptance of Nurse Practitioners and Physician Assistants," staff paper prepared for the report, "A Manpower Policy for Primary Care," Institute of Medicine, National Academy of Sciences, Washington, DC, Jan. 31, 1977.

208. Ruby, G., "Physician Acceptance of Nurse Practitioners and Physician Assistants," staff paper prepared for the report, "A Manpower Policy for Primary Care," Institute of Medicine, National Academy of Sciences, Washington, DC, June 20, 1977.

209. Ruby, G., "New Health Professionals in Child and Maternal Health," *Better Health for Our Children: A National Strategy, Report of the Select Panel for the Promotion of Child Health, Volume IV*, U.S. Department of Health and Human Services, Public Health Service Pub. No. 79-55071 (Washington, DC: 1981).

210. Runnerstrom, L., "The Effectiveness of Nurse-Midwifery in a Supervised Hospital Environment," *Bulletin of the American College of Nurse Midwives* 14(2):40-52, May 1969.

211. Runyon, J.W., "The Memphis Chronic Disease Program: Comparisons in Outcome and the Nurse's Extended Roles," *J.A.M.A.* 231(3):264-270, Jan. 20, 1975.

212. Sackett, D.L., "The Burlington Randomized Trial of the Nurse Practitioner: Health Outcomes of Patients," *Ann. Intern. Med.* 80(2):137-142, February 1974.

213. Salkever, D.S., Skinner, E.A., Steinwachs, D.M., et al., "Episode-Based Efficiency Comparisons for Physicians and Nurse Practitioners," *Med. Care* 20(2):143-153, February 1982.

214. Schafft, G., American Academy of Physician Assistants, Arlington, VA, personal communication, Aug. 20, 1986.

215. Schafft, G., Fasser, C.E., and Cyr, A.B., "The Assessment and Improvement of Knowledge and Skills in Geriatrics for Physician Assistants," prepared under Grant No. (OHDS) 90-AT-0094, Washington, DC, June 1985.

216. Scharon, G.M., and Bernacki, E.J., "A Corporate Role for Nurse Practitioners," *Business and Health* 1(9):26-27, September 1984.

217. Scheffler, R.M., "Physician Assistants: Is There a Return to Training?" *Industrial Relations* 14(1):78-89, February 1975.

218. Scheffler, R.M., et al., "Physicians and New Health Professions: Issues for the 1980's," *Inquiry* 16(3):195-229, fall 1979.

219. Schroeter, J., Information Specialist, American Academy of Physician Assistants, Arlington, VA, personal communication, May 20, 1985.

220. Schultz, P.R., and McGlone, F.B., "Primary Health Care Provided to the Elderly by a Nurse Practitioner/Physician Team: Analysis of Cost-Effectiveness," *J. Am. Geriat. Soc.* 25(10):443-446, October 1977.

221. Schwartz, J.L., "Economic Feasibility and Patient Diagnostic Mix of Family Nurse Practitioners," *Public Health Rep.* 94(2):148-155, March/April 1979.

222. Schwartz, W.B., Newhouse, J.P., Bennett, B.W., et al., "The Changing Geographic Distribution of Board-Certified Physicians," *N. Engl. J. Med.* 303(18):1032-1038, Oct. 30, 1980.

223. Sharpe, T.R., and Banahan, B.F., "Evaluation of the Use of Rural Health Clinics: Attitudes and Behaviors of Primary Care Physicians in Service Areas of Nurse Practitioner Clinics," *Public Health Rep.* 97(6):566-571, November/December 1982.

224. Silver, H.K., Murphy, M.A., and Gitterman, B.A., "The Hospital Nurse Practitioner in Pediatric Practice," *AJDC* 138:237-239, March 1984.

225. Simborg, D.W., Starfield, B.H., and Horn, S.D., "Physicians and Non-Physician Health Practitioners: The Characteristics of Their Practices and Their Relationships," *Am. J. Public Health* 68(1):44-48, January 1978.

226. Slome, C., Wetherbee, H., Daly, M., et al., "Effectiveness of Certified Nurse-Midwives: A Prospective Evaluation Study," *Am. J. Obstet. Gynecol.* 124(2):177-182, Jan. 15, 1976.

227. Smith, C.W., "Patient Attitudes Toward Physi-

cians' Assistants," *J. Fam. Pract.* 13(2):201-204, August 1981.

228. Sobolewski, S.D., "Cost-Effective School Nurse Practitioner Services," *J. Sch. Health* 51(9):585-588, November 1981.
229. Solomon, S., Director, National League for Nursing, New York, NY, personal communication, Aug. 25, 1986.
230. Sox, H.C., Jr., "Quality of Patient Care by Nurse Practitioners and Physician's Assistants: A Ten-Year Perspective," *Ann. Intern. Med.* 91(3):459-68, September 1979.
231. Spitzer, W.O., Sackett, D.L., Sibley, J.C., et al., "The Burlington Randomized Trial of the Nurse Practitioner," *N. Engl. J. Med.* 290(5):251-256, Jan. 31, 1974.
232. Stallmeyer, J., American Nurses' Association, "Direct Reimbursement for Non-Physician Health Professionals Under FEHB," Hearings Before the Subcommittee on Compensation and Employee Benefits, House Committee on Post Office and Civil Service, U.S. Congress, Washington, DC, Apr. 15, 1986.
233. Stein, J., "Nursing Can Gain From Prospective Payment," *Business and Health* 1(5):36, May 1984.
234. Stein, R.E., and Jessop, D.J., "Does Pediatric Home Care Make a Difference for Children With Chronic Illness? Findings From the Pediatric Ambulatory Care Treatment Study," *Pediatrics* 73(6):845, June 1984.
235. Streimer, R.A., Deputy Director, Bureau of Eligibility, Reimbursement, and Coverage, Health Care Financing Administration, U.S. Department of Health and Human Services, Baltimore, MD, personal communication, 1985.
236. Sultz, H.A., "Nurse Practitioners: An Overview of Nurses in the Expanded Role," *The New Health Professionals: Nurse Practitioners and Physicians Assistants*, A.A. Bliss and E.D. Cohen (eds.) (Germantown, MD: Aspen Systems Corp., 1977).
237. Sultz, H.A., Henry, O.M., Bullough, B., et al., "Nurse Practitioners: A Decade of Change—Part IV," *Nurs. Outlook* 32(3):158-163, May/June 1984.
238. Sultz, H.A., Zielezny, M., Gentry, J.M., et al., *Longitudinal Study of Nurse Practitioners, Phase III*, DHEW Pub. No. HRA-80-2 (Washington, DC: U.S. Government Printing Office, 1980).
239. Swoap, D.B., "Beyond DRGs: Shifting the Risk to Providers," *Health Affairs* 3(4):117-121, winter 1984.
240. Tarlov, A.R., "Shattuck Lecture—The Increasing Supply of Physicians, the Changing Structure of the Health Services System, and the Future Practice of Medicine," *N. Engl. J. Med.* 308(20):1235-1244, May 19, 1983.
241. Tresnowski, B.R., "HMOs Are Rolling—and We Can All Benefit," *Inquiry* 21(3):203-204, fall 1984.
242. U.S. Congress, Congressional Budget Office, *Physician Extenders: Their Current and Future Role in Medical Care Delivery* (Washington, DC: U.S. Government Printing Office, April 1979).
243. U.S. Congress, Library of Congress, Congressional Research Service, "The Civilian Health and Medical Services (CHAMPUS) and the Civilian Health and Medical Program of the Veterans Administration (CHAMPVA): An Overview, UH460, 76-143 ED, Washington, DC, July 27, 1976.
244. U.S. Congress, Office of Technology Assessment, *Medical Technology and Costs of the Medicare Program*, OTA-H-227 (Washington, DC: U.S. Government Printing Office, July 1984).
245. U.S. Congress, Office of Technology Assessment, *Technology and Aging in America*, OTA-BA-264 (Washington, DC: U.S. Government Printing Office, June 1985).
246. U.S. Congress, Office of Technology Assessment, *Payment for Physician Services: Strategies for Medicare*, OTA-H-294 (Washington, DC: U.S. Government Printing Office, February 1986).
247. U.S. Department of Health, Education, and Welfare, "The Effect of Task Delegation on the Requirements for Selected Health Manpower Categories in 1980, 1985, and 1990," final report contract No. NIH 72-44006, Washington, DC, 1974.
248. U.S. Department of Health and Human Services, Health Care Financing Administration, *Medicare's Carrier Manual* (Baltimore, MD: n.d.).
249. U.S. Department of Health and Human Services, Public Health Service, Health Research Services Administration, *Registered Nurse Population and Overview*, DHHS Pub. No. HRS-P-OD-83-1 (Washington, DC: U.S. Government Printing Office, November 1982).
250. U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, *Diffusion and the Changing Geographic Distribution of Primary Care Physicians*, DHHS Pub. No. HRS-P-OD-84-1, HRP 0904702 (Washington, DC: U.S. Government Printing Office, June 1983; revised November 1983).
251. U.S. Department of Health and Human Services, Public Health Service, Bureau of Health Professions, *Report to the President and Congress on the Status of Health Personnel in the United States, Vols. I and II*, DHHS Pub. No. HRS-P-

OD 84-4 (Washington, DC: U.S. Government Printing Office, 1984).

252. U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Bureau of Health Professions, Division of Nursing, "1984 National Sample Survey of Registered Nurses," Rockville, MD, 1984.

253. U.S. Department of Health and Human Services, Public Health Service, National Center for Health Statistics, *Midwife and Out-of-Hospital Deliveries: United States*, Vital and Health Statistics Series 21, No. 40, DHHS Pub. No. 84-1918 (Washington, DC: U.S. Government Printing Office, February 1984).

254. U.S. Department of Health and Human Services, Public Health Service, National Institute on Aging, *Report on Education and Training in Geriatrics and Gerontology*, Administrative Document, February 1984.

255. U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, *Fifth Report to the President and the Congress on the Status of Health Personnel in the United States*, DHHS Pub. No. HRS-P-OD-86-1, HRP 0906767 (Washington, DC: U.S. Government Printing Office, March 1986).

256. U.S. Office of Personnel Management, Compensation Group, "A Study Relating to Expanding the Class of Health Practitioners Authorized To Receive Direct Payment or Reimbursement in Accordance With 5 U.S.C. 8902(k)(1)," Washington, DC, March 1986.

257. Urban Medical Group, Inc., "Improving Care and Reducing Costs for Nursing Home Residents: A Fact Sheet," Jamaica Plain, MA, Feb. 5, 1985.

258. Utah Department of Health, Office of Management Planning, Bureau of Rural Health Services, "Midlevel Practitioners Manpower Study," draft, Salt Lake City, UT, May 6, 1985.

259. Watkins, L.O., and Wagner, E.H., "Nurse Practitioner and Physician Adherence to Standing Orders Criteria for Consultation or Referral," *Am. J. Public Health* 72(1):22-29, January 1982.

260. Watt, J.M., Derzon, R.A., Renn, S.C., et al., "The Comparative Economic Performance of Investor-Owned Chain and Not-for-Profit Hospitals," *N. Eng. J. Med.* 314(2):89-96, Jan. 9, 1986.

261. Weston, J.L., "Distribution of Nurse Practitioners and Physician Assistants: Implications of Legal Constraints and Reimbursement," *Public Health Rep.* 95(3):253-258, May/June 1980.

262. Weston, J.L., "NPs and PAs: Changes—Where, Whether, and Why," National Center for Health Services Research, Office of the Assistant Secretary for Health, Public Health Service, U.S. Department of Health and Human Services, Washington, DC, November 1984.

263. Weston, J.L., Senior Research Manager, National Center for Health Services Research, Public Health Service, U.S. Department of Health and Human Services, Washington, DC, personal communication, Apr. 2, 1985.

264. Williams, A.P., Schwartz, W.B., Newhouse, J.P., et al., "How Many Miles to the Doctor?" *N. Engl. J. Med.* 309(16):958-963, Oct. 20, 1983.

265. Williams, C.A., "Nurse Practitioners: Efficacy, Barriers to Practice, and Action Alternatives," prepared for a Frank Porter Graham Child Development Institute Conference, Chapel Hill, NC, 1983.

266. Wright, D.D., Kane, R.L., Snell, G.F., et al., "Costs and Outcomes for Different Primary Care Providers," *J.A.M.A.* 238(1):46-50, July 4, 1977.

267. Zikmund, W.G., and Miller, S.J., "A Factor Analysis of Attitudes of Rural Health Consumers Toward Nurse Practitioners," *Res. Nurs. Health* 2(2):85-90, June 1979.

268. Zimmer, J.G., Groth-Juncker, A., and McCusker, J., "Effects of a Physician-Led Home Care Team on Terminal Care," *J. Am. Geriat. Soc.* 32(4):288-292, April 1984.

Office of Technology Assessment

The Office of Technology Assessment (OTA) was created in 1972 as an analytical arm of Congress. OTA's basic function is to help legislative policymakers anticipate and plan for the consequences of technological changes and to examine the many ways, expected and unexpected, in which technology affects people's lives. The assessment of technology calls for exploration of the physical, biological, economic, social, and political impacts that can result from applications of scientific knowledge. OTA provides Congress with independent and timely information about the potential effects—both beneficial and harmful—of technological applications.

Requests for studies are made by chairmen of standing committees of the House of Representatives or Senate; by the Technology Assessment Board, the governing body of OTA; or by the Director of OTA in consultation with the Board.

The Technology Assessment Board is composed of six members of the House, six members of the Senate, and the OTA Director, who is a nonvoting member.

OTA has studies under way in nine program areas: energy and materials; industry, technology, and employment; international security and commerce; biological applications; food and renewable resources; health; communication and information technologies; oceans and environment; and science, education, and transportation.

OTA-HCS-37

DECEMBER 1986